

FLIGHT

First Aero Weekly in the World.

Founder and Editor: STANLEY SPOONER.

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport.

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EDITORIAL COMMENT.

UNDoubtedly the debate on Thursday of last week on the Air Services was timely, and, to a very great extent, assisted to clear up many of the points upon which information has been urgently and legitimately demanded by the public. Naturally, all was not said that might have been without in the least degree militating against the national interest, but there is this much to be thankful for, that it did clear the air to a very appreciable extent and disposed of several of the points upon which criticism has been hung in the past. Furthermore, in the light of the official statements that were made we are justified in the hope that the last has been heard of the hopeless muddles which have been so grave a feature of the administration of the flying services in times gone by.

The Air Debate in the House.

There are many points in the debate, a very full report of which we produce in another part of this issue of "FLIGHT," which are well worth while pondering. To begin with, Major Baird told the

House that at last everything in connection with the Air Board and its relations with the fighting services and the Ministry of Munitions is harmonious and everything that it should be. We are more than delighted with the assurance, for if there is one thing more than another that has kept back the development of the service it has been the spirit of departmentalism, which while it may be natural where two or more services are each looking out to serve its own interests—and often properly so—must of necessity be very gravely to the detriment of progress over the whole. If the new Board had done nothing more than to eliminate the ruinous competition and the departmental jealousy that subsisted in the air services for two years of the war it might be held to have justified its existence.

Over and above the mere assertion that at last methods and relations have been properly co-ordinated, Major Baird took the House through a most interesting explanation of how this has been achieved, and showed how the grouping of all departments of the Air Services under a single roof has tended towards much greater efficiency, and, we must admit, thoroughly justified the policy which led up to the new system of centralisation. Not only has a great deal been done, but more is in process of being carried out in order to introduce even more smoothness and efficiency into the vital task of keeping our designs well abreast of every development in aircraft and engines, and the speedy appearance in active use of the newest and best types of machines. A new department is in process of creation for the purpose of dealing with inventions, with the aid of officers who have been employed in the Inventions branches of the Navy, Army and the Ministry of Munitions, in so far as aircraft inventions are concerned. That is an excellent move, but it certainly gives point to a great deal of the criticisms of delay that have been directed against those responsible for the efficiency of our aircraft service that it has required nearly three years of desperate war to convince them that it was necessary to create a special branch, in close relation with those who direct our aerial policy, to examine and report upon inventions. True, the information secured by the inventions branches of the three departments concerned has doubtless been available to all—in time. But where time is the essence of the contract, every system that tends to its waste ought to be ruthlessly scrapped at once, and this roundabout method of doing things *would* have been scrapped, and something more efficient substituted for it in

fewer months than the years it has taken the Government to discover that it is cumbrous, had a private corporation been concerned. However, it is being done now, which is altogether to the good. Another good thing the House was told in this connection was that the Air Board has established a very close *liaison* with our French Allies, and is arranging to keep in similarly close touch with the American Air Service. On the other hand, Mr. Pemberton Billing challenged the last statement by alleging that we had actually refused to give the Americans access to our designs or to our latest types of engines, owing to some commercial cause. If that be so, then it does not appear that the close *liaison* of which Major Baird spoke is working very effectively. We are out to win the war, commercial considerations or no commercial considerations. If there is anything of the sort operating as a cause, then it must be swept away without an instant's delay. There may be some question of patent rights, or something of the sort in question, but all these matters are merely a question of finance, and where we are spending the huge sums we are on the prosecution of the war we cannot afford to let a few thousands of pounds stand in the way. The shortest and cheapest way to success lies in perfect co-ordination between ourselves and our Allies, and money spent in co-ordinating the common effort is money well spent.

Production and its Increase.

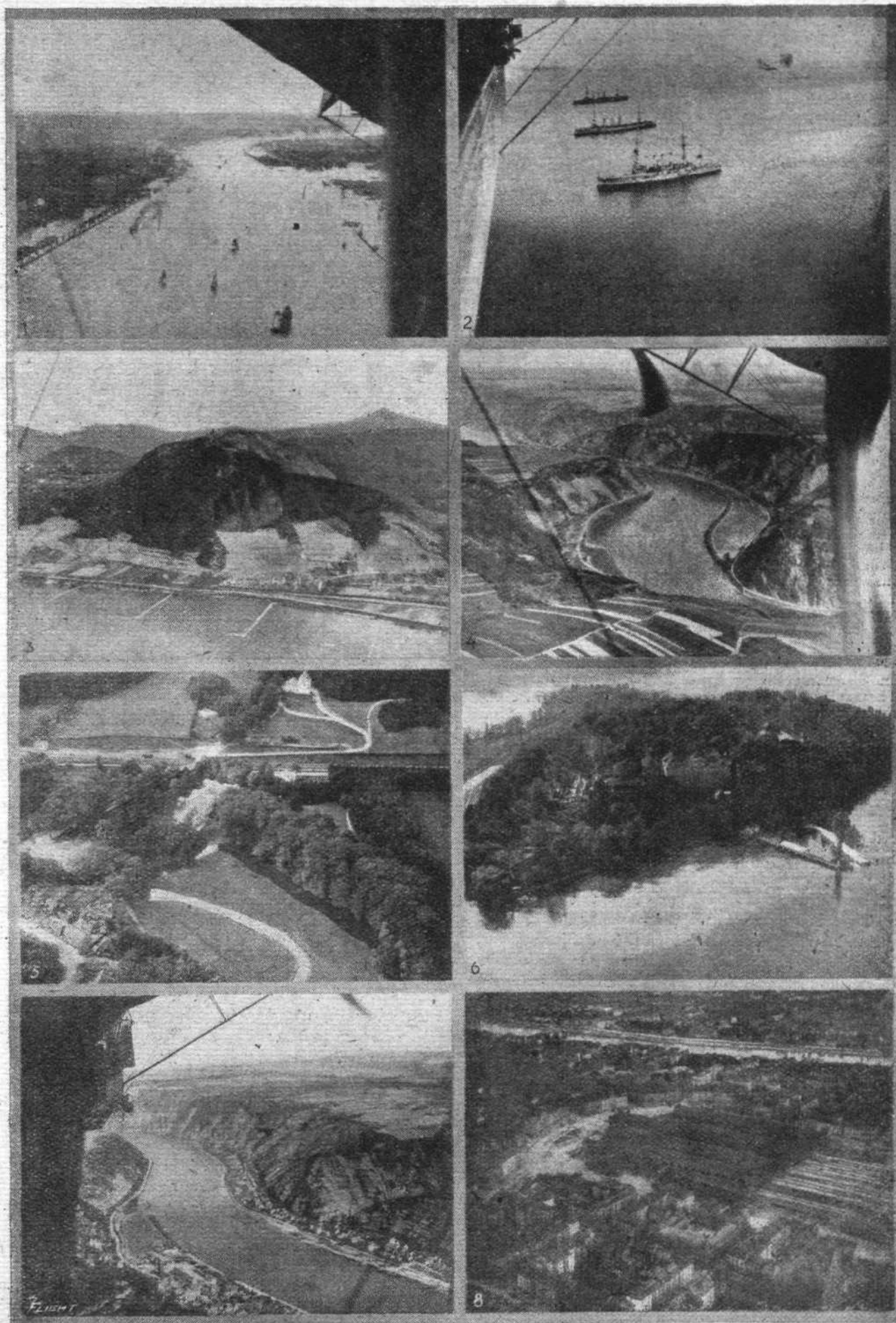
In the matter of the increased production of aircraft, Major Baird gave the House some reassuring figures. As he pointed out, it is impossible to give actual figures, but he dealt with the matter as one of ratios. Taking the figure of production for the whole of last year as being a ratio of eight per month, he said that the output for the first two months of this year was as 16, the anticipated output for the succeeding three months is 19, and it was hoped that by the end of the year even that figure would have been doubled. In making this statement he paid a glowing tribute to the work of the predecessors of the present administration. Anything that can be done, he said, by new arrangements which did not come into force until this year cannot show any appreciable effect certainly until the latter half or the third quarter. It was only fair to remember that the very substantial increase in output was entirely due to the energy and foresight shown by those whom the present administration had succeeded. We say it in no spirit of carping criticism, but we should have felt more pleased if the gallant officer had been able to assure the House that the matter goes deeper than mere increase in output of machines and that type for type we had made equally rapid progress in design. We have never questioned that output has been enormously accelerated. What we have been and are still anxious to know is that we are turning out "best" machines in satisfactory numbers.

Mr. Joynson-Hicks raised this point after the statement by the Parliamentary Secretary to the Air Board. As he pointed out, the War Office is doubtless satisfied with the "best" machines we have at the Front, but the trouble is that we have not enough of them. Mr. Joynson-Hicks averred that the percentage of these machines was only about 4 per cent. of the whole number now in France, and very pertinently asked if the Air Board was in a position to say that there is any possibility of even 50 per cent. of our machines at the Front being replaced by the best type during the course of the coming

summer? Replying to his own question, Mr. Joynson-Hicks said that he feared there was no such possibility, and proceeded to say that it might have been done had it not been for the confusion and the lack of driving force in the last two Air Boards or Air Committees, or whatever they were called. We agree that the retrospect is deplorable, but there is very little use now in indulging in recriminations with regard to the past—that is dead, and must now be allowed to bury its dead. What we are immediately and urgently concerned with is the future, and from that point of view we regret that in his reply to the points raised in the debate Major Baird found it impossible to give any definite reply to the question of the replacement of out-of-date machines now in use at the Front. Instead, he indulged in generalities regarding the utter impossibility of prophecy in relation to matters concerning aircraft and the various manufacturing difficulties that have a habit of cropping up. Again we have no desire to be hypercritical, but we imagine that any manufacturer of aircraft could have given if not a definite, at any rate a fairly approximate, idea of when he could deliver a stated number of machines. That is all that is implied. The Air Board knows, surely, how many of these new machines it has on order and the dates by which they are contracted for delivery. There is no need to disclose actual figures, but someone must have more than a remote idea when there should be a sufficient number delivered to comply with the terms of the question.

The Mastery of the Air.

It would have been strange if the subject of the mastery of the air had not fallen to be discussed in a full-dress debate on the air services. As a matter of fact, Major Baird himself introduced it in the form of a question addressed to Mr. Joynson-Hicks, in which he asked the latter to say what he meant by the term. In reply, Mr. Joynson-Hicks defined it thus: "We should have in relation to the air exactly what the Royal Navy has to the sea," adding "I leave out for the moment the question of submarines, which is quite a distinct point." Major Baird disputed that there was or could be anything like mastery of the air, basing his point upon the impossibility of making it impossible to the enemy to get through our patrols or to effectively use the air. For our own part, we do not see any ground for dispute here. We have always stood for the "mastery of the air," for which we completely accept the definition of Mr. Joynson-Hicks. We do not expect, nor do we ask, for such a measure of supremacy that no hostile machine can ascend into the air without encountering the practical certainty of destruction. It were simple lunacy to ask for it. But if we keep to the analogy as laid down by Mr. Joynson-Hicks, we certainly do think that we can secure that same measure of supremacy as the Navy holds at sea. The position there is that the enemy's battle fleets dare not show themselves outside the protection of their coast batteries and minefields, but the Germans have from time to time succeeded in letting loose raiders on the trade routes, and to a very small extent have been able to get supplies to their forces overseas. But the mere fact that they have met with some small measure of success in these directions does not detract for a single moment from the outstanding fact that we are supreme on the seas—leaving out, as Mr. Joynson-Hicks said, the question of the submarine, which is a different point.



REPRISALS, AND WHAT OUR PILOTS MAY BE ABLE TO RECOGNISE.—Some German views, as seen from the Zeppelin dirigible "Hansa." 1. View of the river near Hamburg. 2. Above Kiel Harbour. 3. The famous Drachenfels Castle on Rhine. 4. Lorely Rock. 5. Friedrichsruh, Bismarck's country seat, with the mausoleum of the Iron Chancellor. 6. Mainau, an island in Lake Constance, the Grand Duke of Baden's summer residence. 7. St. Goarshausen-on-Rhine. 8. Central Station, Frankfurt-on-Main.

The R.A.F. and Manufacture. One really satisfactory point that emerged in the course of the debate was that there is no intention to go back on the principle, so often enunciated, that the R.A.F. should confine its activities to trials, experiment and research, leaving the business of manufacture to the private constructors. Explaining the functions of the factory, Major Baird said:—

"The factory is an establishment which is under the orders of the Ministry of Munitions, and to that extent its relations with the technical department of the Air Board are precisely the same as the relations between the technical department of the Air Board and any other manufacturer. That is to say, if the factory makes a design, it is submitted to the technical advisers of the Air Board in precisely the same way as the designs of any other recognised manufacturer. But, like every other big factory, it has an experimental side. That experimental side is far larger than in the case of the ordinary commercial factory, and in addition to experiment and research carried on by the factory as such, it carries out any experiments in research work that may be required by the technical department of the Air Board.

"As a proof that research work has not been dropped, I may give the numbers employed in each of these branches as compared with what it was six months ago. In experimental engineering the number is now 90 as compared with 86 six months ago. In the experimental flight department the number is 86 as compared with 83; and in the case of the research department, dealing also with aero dynamics, it is 107 as against 83, so that hon. members will see that there has been no reduction in these activities. As regards the ordering of machines, the policy of the factory is only to manufacture a sufficient number of machines to try the design and to embody any alteration which the Expeditionary Force, from their experience, find necessary to deal with the other changing requirements at the Front. That in practice means, as I have explained, that we get the first batch of machines of Government design made at the factory. They do not continue to produce that machine. The drawings are handed over to manufacturers to produce machines as contractors to the Government.

"They have produced designs, but nothing material. I agree on this point, that you cannot have too much real talent employed on the difficult work of trying to improve the machines. Whether in private factories or in Government factories does not make any difference. The great point is to have the machine as perfect as possible."

We agree that by no stretch of imagination can the building of the first batch of a new type in order to test design be construed into "manufacture," and so long as the activities of the Factory are confined to this, we see no cause for fault-finding. It may be a debatable point as to what number of machines is sufficient to thoroughly try out a design, and exactly where experiment ends and manufacture begins. That, however, is a matter upon which no one is likely to indulge in hair-splitting at a time like this. It is sufficient for the time being to have the assurance that the policy defined before the war has not been modified, and that there is no present intention of making any change.

The Need for a Separate Air Service. In the course of a long and interesting speech, Mr. Joynson-Hicks advocated the departure from our present fighting organisation which we ourselves laid down many months ago as being the nearest to the ideal for the purposes of a Power like the British Empire. He expressed himself as being altogether in favour of a Third Service, separate and distinct altogether from the Navy and Army, and to be directly under the control of the Air Ministry—a Service which we have before defined as a Strategic Air Service, as distinct from the tactical air arm for operation with armies in the field and fleets at sea.

It is very probably impossible that we shall realise this ideal during the present war. We began it with

too much leeway to make up, and it has taken all our energies to overtake the consequences of the official failure to see further into the future than the immediate to-morrow. All our resources have been devoted to supplying the ever-expanding requirements of our Expeditionary Forces, and we have had neither time nor material to devote to the creation of that larger Service which must be created later on if we are to maintain ourselves in a position of safety among the nations. If we were now in possession of such a Third Service, controlled by a Board which was free to plan without regard to the needs of the army overseas, we should have been able to put a stop to "frightfulness" by the elemental process of hitting the Hun where he lives—which is the thing he hates most of all—besides being able to exercise an effect on the war which it is impossible to assess. Apparently, the idea of such a Service does not meet with any great measure of official approval at the moment, and we may say that we can fully appreciate the tremendous material difficulties that stand in the way of its creation in the middle of such a war as the one we are now engaged in. But once the war is over and the period of reorganisation has come, it is very much to be hoped that we shall see immediate steps taken to put the whole of our aerial defences on a new and satisfactory basis. Nothing that does not include a separate Air Service, constituted on the same lines as the Navy and the land forces, can be held to completely fill the bill. We are fully aware that to talk now of reorganising our fighting services after the war appears to savour of futility, but it must be remembered that the lessons of war are the soonest forgotten of all when peace reigns over the world. The time to put reorganisation in line is during the period of war, when lessons and needs are very much in everybody's mind.

Commercial Aviation After the War.

One other very important point that emerged during the debate, and one that we are unfeignedly pleased to note, is that the Air Board is making preparations to assist the cause of commercial aviation after the war. The number of firms now actively engaged in some shape or form in the aircraft industry reaches the surprising total of 958. That number, be it said, is on the list of the Director of Aeronautical Supplies, and there are in addition numberless other small sub-contracting firms who do not figure in that list. It is obvious that at the end of the war these firms will have to find fresh outlets for their enterprises, or else go out of the business, which would be disastrous both to themselves and to the nation. Speaking on this aspect of the aeronautical situation, Major Baird made this interesting announcement:—

"Although its functions are restricted to heavier-than-air machines, and although it has nothing to do with operations, the Air Board does have the duty of considering air policy, and in connection with air policy it appeared to the Board, and it has been approved by the Prime Minister, that it should be our duty to investigate the question of aerial civil transport after the war. It will be apparent to hon. members that when the war comes to an end there will be not only a vast number of highly skilled pilots, but there will be a large number of aeroplanes in the hands of the Services, and a still vaster number of aeroplanes and aerial engines on order. I have quoted the number of people engaged in the air industry to-day. They are more likely to increase than diminish. This whole great industry has been built up for the purposes of the war, to make use in warfare of an element which certainly cannot be neglected in peace. Therefore it does not appear to be unreasonable that the

Air Board should take up as a subject of inquiry as far as possible the uses that can be made of aircraft after the war, and for that purpose it has been decided to institute a Committee, of which Lord Northcliffe has been asked to take the chair, and has accepted, and it is proposed that the Committee should comprise representatives not only of the two Services and of the Air Board, but also of the Board of Trade, the Post Office, the Foreign Office, the Colonial Office, the Customs, and the Treasury, representatives from the Dominions, representatives, of course, of the manufacturers and designers in this country, and obviously it would be desirable that Parliament should also be represented. The terms of reference are as follows:—

"To consider and report to the Air Board with regard to:—

"(1) The steps which should be taken with a view to the development and regulation, after the war, of aviation for civil and commercial purposes, from a domestic, an Imperial, and an international standpoint.

"(2) The extent to which it will be possible to utilise for the above purpose the trained personnel and the aircraft the conclusion of peace may leave surplus to the requirements of the Naval and Military Air Services of the United Kingdom and Overseas Dominions."

The Board is not only to be congratulated upon its decision to thus take under its wing the future of aviation after the war, but upon its admirable choice of a Chairman of the new Committee. No more suitable choice could have been made than that of Lord Northcliffe, whose fervent belief in aviation and magnificent support of the movement when it was in its earliest infancy have been outstanding in the pages of aeronautical history.

Helping on Commercial Aviation.

This announcement of the new Air Board policy lends a great deal of additional interest to the lecture to be given by Mr. Holt Thomas before the Aeronautical Society on the 30th of this month, on "Commercial Aeronautics," at which Lord Cowdray, the President of the Board, will most appropriately preside. Mr. Thomas proposes to treat the whole subject of the commercial future of aviation in the light of experiments he has actually carried out with a view to obtaining reliable data relating to the costs of fares and freights to various parts of the world, the delivery and collection of mails and passengers, both inland and overseas, and other aspects of the undoubtedly very wide field which is open to him. That he will deal fully and adequately with his great subject we, knowing the enormous amount of practical experience Mr. Holt Thomas has had in aviation, and the thorough and painstaking work it is his habit to put into all his undertakings, are assured that his lecture will certainly not be the least interesting and informative of a series which has been remarkable during the whole season for both those very desirable qualities. We confess that, for our own part, we are looking forward with considerable eagerness to hear what Mr. Holt

Thomas will have to tell us about what is, after all, far and away the most important side of the whole aeronautical movement.

Tell Our American Allies!

The Washington correspondent of the *Times* cables a very pertinent appeal for more information to be given to the American people regarding the more personal aspects of the war and the individual achievements of our fighting men. He points out that there is a disposition in the United States to treat the war as being very greatly a matter of purely academic interest and to discount the difficulties that still lie before us in the path to victory. As he says, the American public believes that whatever happens the Allies are bound to win, and that all it is necessary for them to do is to find the money and speed up the production of munitions. Naturally, this feeling is meeting with every encouragement from the German element, and the *Times* correspondent puts it that the only way to counter their activities is to be as frank as possible about our difficulties and as inspiring as possible in our accounts of the way in which we are coping with them. As an example of what he means, he quotes the story of the recent destroyer action in the Channel, which, he says, has resounded from one end of the country to the other. So have the exploits of our aeroplanes, the consequence being that the Aviation Service is the only branch in the States in which recruiting is really good.

One of our greatest troubles is that as a nation we are unimaginative, not to say a bit too modest about ourselves. We are too apt to think that things that really matter are of no consequence when we happen to have done them ourselves. Anything in the way of drum-beating is abhorrent to the British character—in a word, we are not good advertisers of ourselves. That trait has stood out ever since the beginning of the war, with the result that even now some at least of our Allies are still prone to ask what we are doing to help in winning the war. As a matter of fact, it is only in France that the full measure of our sacrifice in the great enterprise is fully appreciated, and even that is only the event of yesterday. In Russia and in Italy there are still masses of the people who hardly know that we are doing anything at all. It is the same in neutral countries—our propaganda has been distinctly bad, although we have spent a great deal of money on it. It is to be hoped that, late as it is, the Government will take note of the thoroughly sound advice of the *Times*, and see to it that the American imagination is stimulated by something more virile than the bald *communiqués* that are our war pabulum of the day.

French Honours for the R.F.C.

A SUPPLEMENT to the *London Gazette* issued on May 1st announced that the following Decorations and Medals have been conferred by the President of the French Republic, at various dates, for distinguished services rendered during the course of the campaign:—

LEGION D'HONNEUR.

Croix de Commandeur.

Lt.-Col. and Brev. Col. (tp. Brig.-Gen.) E. B. ASHMORE, C.M.G.

Croix de Chevalier.

Lt. (temp. Capt.) D. R. HANLON, R.A. and R.F.C.

CROIX DE GUERRE.

Temp. 2nd Lt. J. L. BAMFORD, Gen. List, attd. R.F.C.

Lt. (tp. Capt.) A. D. BELL-IRVING, Gor. Hrs. (S.R.) and R.F.C.

2nd Lt. V. W. B. CASTLE, R.F.C. (S.R.).

Lt. (temp. Capt.) J. A. G. DE COURCY, M.C., R.A. and R.F.C.

Temp. 2nd Lt. R. V. FRANKLIN, Gen. List and R.F.C.

2nd Lt. (temp. Capt.) J. W. GORDON, R.F.C. (S.R.).

Temp. 2nd Lt. C. H. MARCHANT, Spec. List and R.F.C.

2nd Lt. (temp. Capt.) R. J. MOUNSEY, Hamps. and R.F.C.

Temp. 2nd Lt. H. L. PATEMAN, Spec. List and R.F.C.

Temp. Lt. (temp. Capt.) J. B. QUESTED, A.S.C. and R.F.C.

1983 Sergt. A. ARMSTRONG, R.F.C.

7216 Sergt. C. J. BUTLER, R.F.C.

896 Sergt. E. J. FARLEY, R.F.C.

23897 Sergt. E. HANDLEY, R.F.C.

635 Sergt. P. M. VEITCH, R.F.C.

MEDAILLE MILITAIRE.

297 Actg. S.M. (now 2nd Lt.) J. P. ANGELL, R.F.C.

10060 Sergt. L. S. COURT, R.F.C.

2550 Corpl. A. DALZIEL, R.F.C.

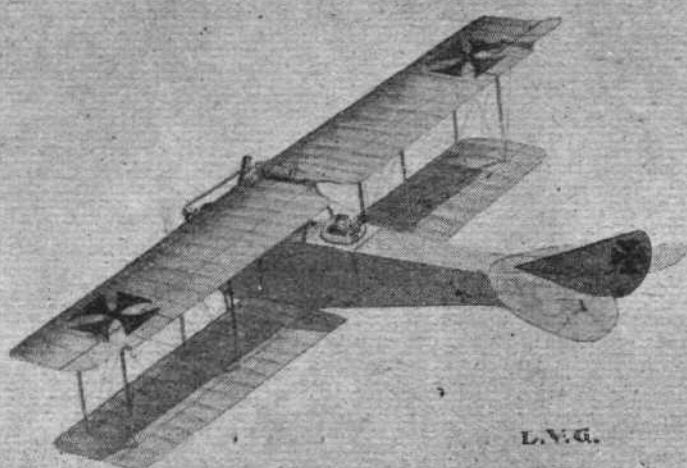
5223 Sergt. G. R. HORROCKS, R.F.C.

5954 1st Air-Mech. (now temp. 2nd Lt.) J. L. MILES, R.F.C.

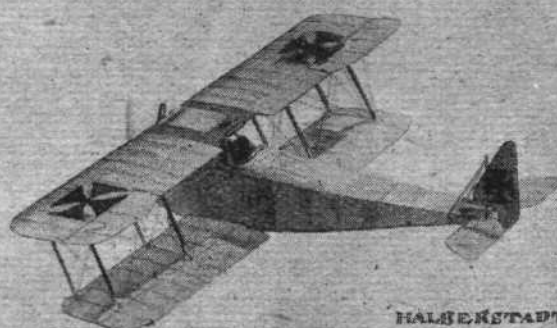
8193 1st Air-Mech. W. E. LOWRIE, R.F.C.

1895 Sergt. A. TURTON, R.F.C.

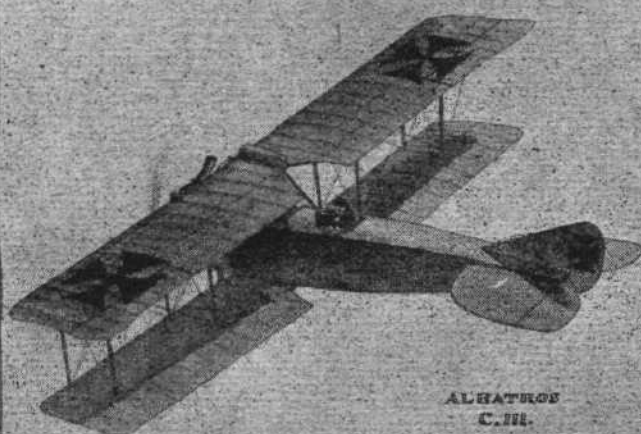
6671 1st Air-Mech. C. R. TWEEDDALE, R.F.C.



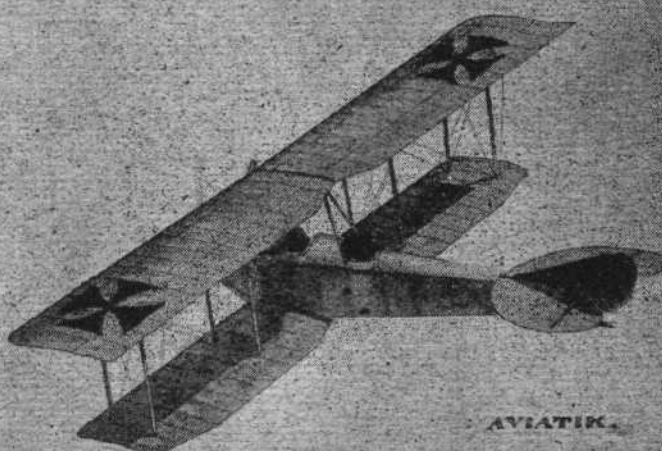
L.V.G.



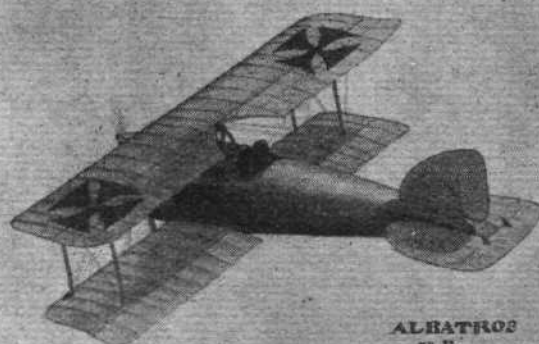
HALBERSTADT



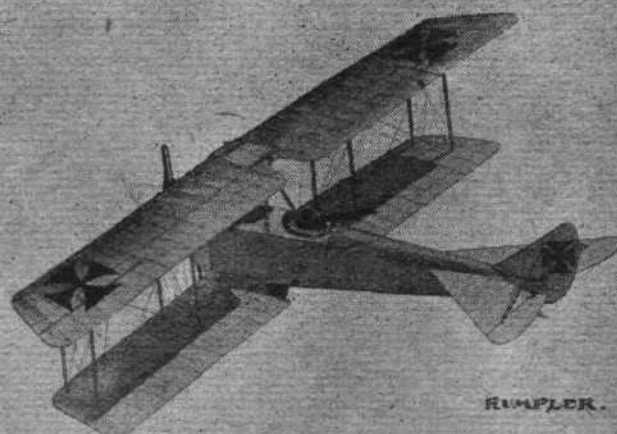
ALBATROS
C.III.



AVIATIK.



ALBATROS
B.C.



RUMPLER.

The Identification of German Aeroplanes. Plate III.

(See also page 415.)

IDENTIFICATION OF GERMAN AEROPLANES.

(COPYRIGHT.)

(Continued from page 393.)

IN our last issue we published sketches of six different German aeroplanes, all shown from the same point of view, *i.e.*, three-quarter front from below, and all relatively to the same scale. This week the series is continued with the same machines from a different point of view. The reason for illustrating the various machines all in the same attitude is, as was pointed out last week, that by so doing comparison is facilitated. Later on, when the machines have been illustrated in what appears to us to be a sufficient number of attitudes, we may collate the different sets in groups showing each machine in its different attitudes, thereby illustrating, not so much the differences between the various machines, but all the special features of each.

From the views published this week it will be seen that such features as dihedral angle and backswept or, as the Americans call them, retreating wings, do not appear to be of much help for identification purposes, since some machines possess one feature, some the other, and some both or neither, and it will often be found impossible to determine whether the slope of a wing is due to one or the other. The relative size of the machines is, as before, well brought out in this view, as are also such distinctive features as the overhang of the top planes, the shape of the wing tips—whether raked, straight, or rounded—and the form of the *ailerons*.

A further peculiarity which may be helpful, and which is emphasised in this set as well as in that published last week, is the size and shape of the cut-out portions of the trailing edge of the wings. Thus it will be noticed that in the Halberstadt the opening in the top plane is of rectangular shape, while the lower planes have not been cut away near the body. In the Albatros B5 the trailing edge of the lower planes also runs right up to the sides of the body, but the top plane has a wide semi-circular portion cut away. Of the four larger machines the L.V.G. is the only one that does not have the trailing edges of the lower wings cut away near the body, and the opening in the top wing is quite small. The other machines have both upper and lower wings cut in varying degree, the size and shape of the cut-away portions being clearly indicated in the illustrations.



The Air Board and Aerial Civil Transport.

FROM the full report of the debate on April 26th on the Air Board, which appears elsewhere in this issue, it will be seen that Major Baird, Parliamentary Secretary to the Air Board, stated that a Committee, to include representatives not only of the two Services and the Air Board but also of the Board of Trade, Post Office, Foreign Office, Colonies, Treasury, &c., is being appointed, under the Chairmanship of Lord Northcliffe, to enquire into the question of Aerial Civil Transport after the war. The terms of reference are as follows:—

"To consider and report to the Air Board with regard to:

(1) The steps which should be taken with a view to the development and regulation after the war of aviation for civil and commercial purposes from the domestic, Imperial, and international standpoints; (2) the extent to which it will be possible to utilise for the above purposes the trained personnel and the aircraft which the conclusion of peace may leave surplus to the requirements of the Naval and Military Air Services of the United Kingdom and Overseas Dominions."

A feature that is very clearly brought out in the view published this week is the shape of the tail planes, which are, of course, seen from above, thus giving a better idea of the peculiarities of fins and rudders than was possible in views from underneath. It might be objected that the gunner on the ground would never see an aeroplane from the point of view chosen this week. With this we do not quite agree, since it is possible, as the reader may convince himself by holding the page out at arm's length and slightly above his head, to see the aeroplanes from this point of view when they are doing a steeply banked turn. In any case we trust that the utility of this series of illustrations may not be confined to anti-aircraft gunners, but may be extended to pilots as well. For the guidance of those pilots who are not familiar with the gun placing on the various machines, the present set should be useful in showing the number of seats of each type and where the gunner is situated, whether in the front or rear seat. The two smallest machines, the Halberstadt and Albatros B5, are single seaters, all the others being two-seaters. Where the gunner occupies the rear cockpit it will in many cases be found that the pilot is equipped with a synchronised gun firing forward and sighted by steering the machine itself. The same applies to the single seaters, which are, we believe, frequently equipped with two synchronised guns firing straight forward. Whatever the positions of the guns, and this may very probably be changed from time to time, the safest point from which to attack any one of the machines here illustrated is to the rear of and below the tail of the German aeroplane, since here the gunner is prevented by his own tail planes from effectively replying.

The following table gives the approximate dimensions of the various machines:—

Name of Machine.	Span.		Gap.	Chord.		Length O.A.
	Top.	Bot.		Top.	Bot.	
	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.
Albatros C. III..	39 2	37 3	5 3	6 1	26 4	
Albatros B5..	28 4	26 9	5 3	5 9	24 0	
Aviatik ..	41 0	35 4	6 4	6 1	26 3	
Halberstadt ..	28 6	26 0	4 6	5 0	24 0	
L.V.G. ..	42 10	37 10	5 6	5 10	27 0	
Rumpler ..	40 10	36 10	5 9	5 6	26 4	

Raid on German Destroyers.

The Admiralty issued the following on April 24th:—

"The Vice-Admiral at Dover states that he has received a report from Dunkirk to the effect that on the afternoon of April 23rd reconnaissance machines reported the presence of hostile destroyers, and three British naval machines were despatched to attack them. Five enemy destroyers were seen at 4.10 p.m., steaming between Blankenburgh and Zeebrugge in a north-easterly direction five miles off the coast. The leading machine attacked, dropping 16 bombs, one of which was seen to obtain a direct hit. The remaining four destroyers scattered, and were attacked by the two remaining machines, 32 bombs being dropped. The leading destroyer was observed to take a list to port and remain stationary after all bombs had been dropped. The four destroyers closed on the disabled craft. A hostile seaplane attacked our machines, but was easily driven off. At 6.10 p.m. four destroyers were reported by reconnaissance machines entering Zeebrugge Harbour. It is considered most probable that one destroyer was sunk."

A semi-official telegram from Berlin claims that:—

"No damage or loss of life was caused by the enemy machines, which were driven off by our battle one-seaters."

THE "TOTALLY ENCLOSED" AEROPLANE.

(Continued from page 388.)

ON looking back it appears that for the year 1913 Russia held the lead as regards the construction of "totally enclosed" aeroplanes, at any rate as far as actual flying of this type is concerned. No other country, during that period, actually witnessed successful flights on an aerial "Limousine." There can be little doubt, however, that in other countries machines



The Sikorsky biplane "Grand," successfully flown during 1913.

were in preparation, although they did not take the air until the following year. In the case of the Sikorsky "Grand," the "enclosed" feature was, perhaps, to a large extent incidental, being the logical result of the other characteristics of the machine, which was of very large dimensions. When the machine first made its appearance there were those who ventured to prophesy that it would never fly, but as soon as everything was in readiness Mons. Sikorsky soon convinced his critics of their mistake. The "Grand" flew, and flew very well indeed.

two seats, one on each side of the cabin, in front of which were the dual controls. Normally the controls on the left were the main ones, and in front of them were mounted all the various instruments. Between the two seats was an open space leading to a door opening out on to the open part of the body in the extreme nose. From here observations could be made with ease, as the position was so far forward as to be well clear of all obstructions. For use at night a searchlight was placed right out in the bow, where it would not dazzle the pilot but would illuminate the landing ground.

The central portion of the cabin was set aside for the accommodation of passengers. As was to be expected in a machine so elaborately equipped, the passengers were not asked to squeeze into seats of the ordinary bucket type. Chairs, well upholstered and not fixed to the floor, were placed alongside the windows. Communication between passengers' and pilot's cabins was by means of a glass door, and thus any passenger could walk through the pilot's compartment out on the open front portion of the body, where a more unobstructed view was obtainable. From illustrations of the "Grand," the doors leading out into the open appear to be, instead of sliding, of the swinging pattern, so that opening them against the pressure of the air may have been attended with some difficulty.

To the rear of the passengers' compartment was a partition, with a door leading to the aft cabin, which was divided into two, one part of it being set aside for housing spare parts, while the other contained a sofa on which those weary of the journey might lie down and have a rest. It is stated that the cabin walls so reduced the noise of the engines, that conversation could be carried on quite comfortably inside the cabin.

In general arrangement the Sikorsky "Grand" was characterised by a very long and shallow body above which the cabin portion extended a considerable distance. A monoplane tail and four vertical rudders constituted the tail units. In front the body rested on the lower main plane, which further supported the four Argus motors of 100 h.p. each that supplied the power. At first these four motors were mounted in pairs, one pair on each side of the body, the front one driving a tractor screw and the rear one a propeller. Later a different arrangement was tried by which the four engines were all placed on the leading edge, two each side, and each driving a tractor screw. Later again the two outer engines were removed altogether, and the machine flew quite well with the remaining two. After having done a considerable amount

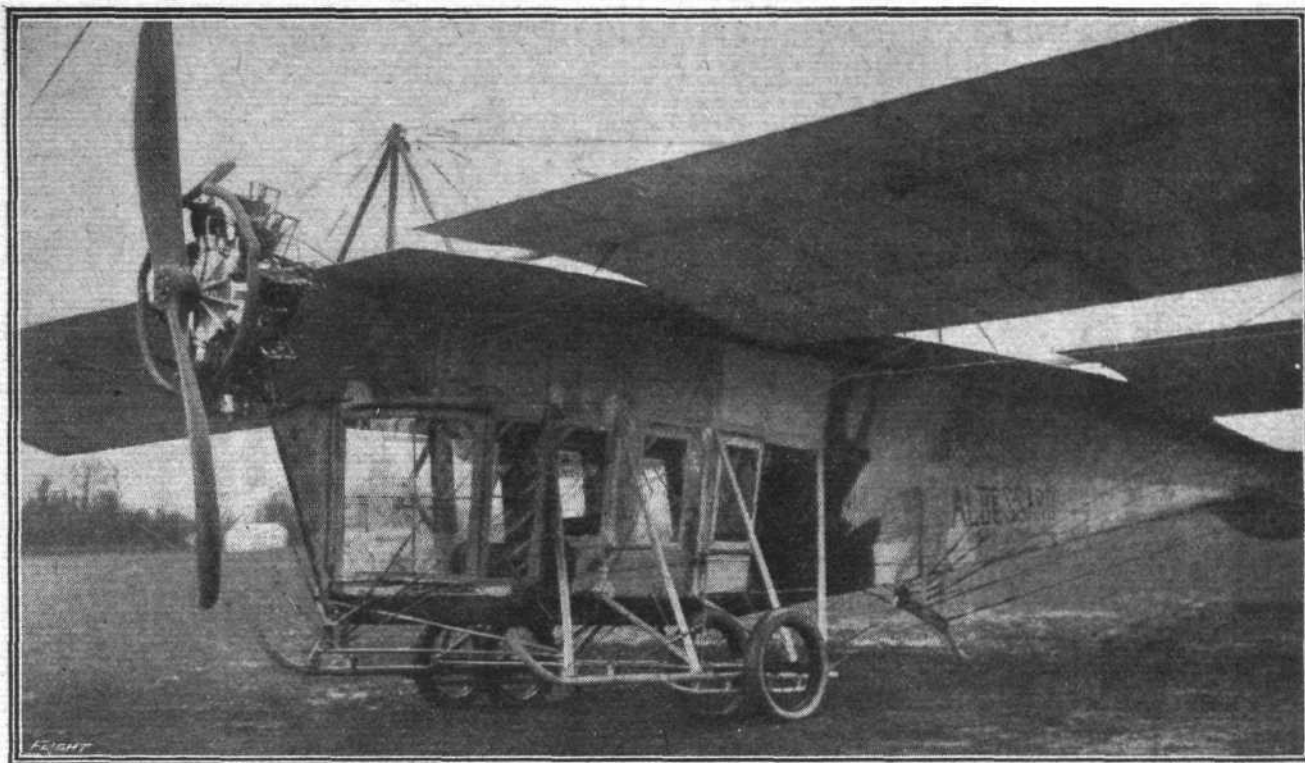


Igor Sikorsky and his fifteen passengers, whom he took up in his giant aeroplane, "Ilia Mourometz," on February 25th, 1914. A portion of the cabin can be seen in the illustration.

Our illustration, which shows only a short part of the very long body, gives a good idea of the cabin portion that forms the most interesting feature, in connection with this article, of the machine. This cabin, which extended from the rear of the wings to some distance in front of the leading edge, was divided into three compartments. In the front one were

of flying and established a world's record for passenger carrying — 1 hour 54 minutes with pilot and seven passengers — the "Grand" came to an untimely end through a machine flying overhead shedding its engine, which crashed through the wings of the "Grand."

Instead of rebuilding the damaged "Grand," Mons



The Albessard tandem monoplane, built and flown in France in 1914.

Sikorsky set to work and produced a second machine of somewhat different design, which he named the "Ilia Mourometz." This machine was finished towards the end of 1913, and although its initial trials were not very successful the designer continued to experiment and alter various details, and during the early part of 1914 succeeded in getting some excellent flights out of it. One of the best known of these is the flight made on February 25th, 1914, when Sikorsky made a flight of some 18 minutes' duration accompanied by 15 passengers. In the "Ilia Mourometz" the body was very much deeper than that of the "Grand," so that the cabin did not project above the body proper. Windows were fitted in the side, and extended some distance back of the trailing edge of the wings. The cabin, entered through a side door, which can be seen in our illustration, extended from this door right up to the bows, where the pilot was seated.

Very few particulars of the "Ilia Mourometz" are available, but it appears that it had four engines developing something like 500 h.p. Concerning the machines of this

type built since the outbreak of war nothing may, of course, be said, except that some of these were slightly smaller and had only two engines.

The year 1914 saw the advent of several aeroplanes of the enclosed type. In France one of the earliest to take the air was the Albessard tandem monoplane, shown in the accompanying photograph. This machine had a very roomy body, which was fitted with windows in front, where were accommodated the pilot and two passengers that constituted the human complement. The engine, a 100 h.p. Anzani, was mounted high up in the nose of the body, and was thus well out of the way as regards obstructing the pilot's view. Altogether the Albessard was excellent for visibility, especially in a forward and downward direction, owing to the absence of any bottom plane to restrict the view, but although the machine flew it was never a great success, in all probability due to the arrangement of the wings in tandem, which all authorities agree is a very inefficient one.

(To be continued.)

HONOURS FOR R.F.C.

It was announced in a supplement to the *London Gazette* issued on April 26th that the King had been pleased to confer the Military Cross on the following officers in recognition of their gallantry and devotion to duty in the field:—

2nd Lt. (Temp. Capt.) CHRISTOPHER J. Q. BRAND, R.F.C., S.R.

Whilst on patrol with one other machine he attacked a formation of five hostile machines and shot one of them down in flames. On another occasion he brought down two hostile machines. He has at all times shown great courage and initiative.

*Lt. JAMES RATTRAY BURNS, Sco. Rif. and R.F.C.

When co-operating with artillery, he attacked a hostile machine, and by skilful manœuvring forced it down out of control.

2nd Lt. (Temp. Lt.) W. S. CASTER, Cyclist Bn. and R.F.C.

He led a successful long-distance raid and brought six machines safely back in very bad weather. On another occasion, while leading a long-distance bomb raid, he engaged five hostile machines.

Temp. 2nd Lt. G. C. DELL-CLARKE, Genl. List and R.F.C.

When his machine was set on fire, although himself severely burnt, he landed and extinguished the flames in his machine. Later, although his machine was in a dangerous condition, he flew back to his aerodrome and handed in his reconnaissance report.

Temp. Lt. LEONARD DODSON, Genl. List and R.F.C.

He has continually shown great courage and determination in photographing the enemy's positions under the most trying conditions, and has brought down three enemy machines.

* This name appeared in *Gazette* of Mar. 17th, without deed.

2nd Lt. (Temp. Lt.) H. F. DUNCAN, High.L.I. and R.F.C.

During an aerial combat, although twice wounded, he continued firing until his gun was hit and put of action. He then kept in communication with his pilot during the remainder of the action, and continually informed him as to the whereabouts of hostile aircraft.

2nd Lt. (Temp. Lt.) C. E. M. PICKTHORN, A.S.C., S.R., and R.F.C.

For conspicuous gallantry and devotion to duty in attacking hostile aircraft, and in carrying out difficult reconnaissances. On one occasion, although wounded, he continued his combat and brought down a hostile machine. On two other occasions he brought down hostile machines in flames.

Capt. ALLAN MURRAY JONES, Australian F.C.

When carrying out a raid on a hostile aerodrome he descended to a height of 200 feet under very heavy fire and destroyed two hangars. On another occasion he flew for a total of nine hours and 20 minutes in search of two officers who were lost.

IN the awards of the Distinguished Conduct Medal for acts of gallantry and devotion to duty in the field, appears the following:—

6391 Corpl. (Acting Sergt.) F. Johnson, R.F.C.

IN the awards of the Military Medal for bravery in the field the following appears:—

9272 2nd Cl. Air-Mech. J. H. Beaven, R.F.C.

7770 1st Cl. Air-Mech. F. T. Fowler, R.F.C.

50863 2nd Cl. Air-Mech. A. E. Rudd, R.F.C.

ROYAL AERO CLUB OF THE U.K.

OFFICIAL NOTICES TO MEMBERS.

SPECIAL COMMITTEE MEETING.

A SPECIAL MEETING of the Committee was held on Thursday, the 26th ult., when there were present: Col. Sir Capel Holden, K.C.B., F.R.S. (in the Chair), Lieut.-Col. W. D. Beatty, R.E., Flight Commander John D. Dunville, R.N., Wing Commander A. M. Longmore, R.N., Commodore Godfrey M. Paine, R.N., C.B., M.V.O., and the Assistant Secretary.

Election of Members.—The following New Members were elected:—

2nd Lieut. Walter George Albu, R.F.C.
 Lieut. John James Moon Anderson, R.N.V.R.
 Lieut. Edward Ralph Atkinson, R.F.C.
 Capt. George Neville Beaumont (1st King's African Rifles).
 Capt. Albert Myburgh Van der Byl, H.A.C.
 Brig.-Gen. L. E. O. Charlton, D.S.O.
 Thomas Andrew Common.
 Thomas Murthwaite Dutton.
 Joseph Evans.
 Lieut. Douglas Frederick Harold FitzMaurice, R.N.V.R.
 2nd Lieut. Gerald Henry Foley, R.F.C.
 2nd Lieut. Ronald Percy Cowen Freemantle, R.F.C.
 Lieut. Ernest Mark Gilbert, R.F.C.
 2nd Lieut. I. Vincent Gluckstein, R.F.C.
 Lieut. Walters Russell Goodman, R.E.
 Lieut. Sir Algernon Arthur St. Laurence Lee Guinness, Bart., R.N.V.R.
 Capt. Geoffrey Matheson Gwyther (3rd Suffolk Regt.).
 Harold Percy Hawthorn.
 2nd Lieut. Cecil Holman James (Australian Flying Corps).
 2nd Lieut. Lewis Francis Jones, R.F.C.
 2nd Lieut. Roland Simcox Lovesy.
 Lieut. George Emanuel Pigache.
 Flight Lieut. Lorenzo Arthur Thomas Pritchard, R.N.
 Lieut. George Archibald Scott (Essex Regt.).
 Lieut. James Percy Shaver (Canadian A.S.C.).
 John Davenport Siddeley.
 Capt. Charles Molyneux Smith, R.F.C.
 Capt. Sidney Robert Stammers, R.F.C.
 Flight Commander Henry Karslake Thorold, R.N.
 Sub-Lieut. Cecil Holmes Waghorn, R.N.V.R.
 2nd Lieut. Frank Young.
 Lieut. Harry Wilson Young, R.F.C.

Official Organ.—On the motion of the Chairman, it was unanimously resolved:—

"That in view of the shortage of paper a notice be inserted in the next issue of the Official Organ to the effect that after the 12th May, 1917, copies of "FLIGHT" will only be sent to those Members who intimate to the Club in writing that they wish to continue to receive the paper."

Life Membership.—It was decided that the Compounding Fee for Life Membership of the Club would, as from April 26th, 1917, be Fifty Guineas.

Club Solicitors.—Messrs. Harrison, Pollock & Harrison were appointed the Solicitors of the Club for the current year.

Club Stewards.—The following Club Stewards were re-elected:—

The Earl of Lonsdale.
 Admiral the Hon. Sir Edward H. Seymour, P.C., G.C.B., O.M., G.C.V.O.
 The Hon. Arthur Stanley, M.V.O., M.P.
 Sir Charles S. Henry, Bart., M.P.
 Lieut.-Gen. Sir David Henderson, K.C.B., D.S.O.
 Professor Sir John H. Biles, LL.D., D.Sc.

By-Laws.—The revised By-Laws of the Club were confirmed.

Fatal Accidents.

AN inquest was held on April 18th on Lieut. H. Pater, W. Yorks. Regt., att'd. R.F.C., who had met with a fatal accident at an aerodrome near Lincoln. According to the evidence the deceased, who had been qualified as a pilot, started off as a passenger in a machine piloted by another officer. In taking off, however, the machine failed to clear another one which was standing on the ground. Lieut. Pater was dead when taken from the wreck. A verdict of "Accidental Death" was returned.

Lieut. G. W. Wildman, R.N.V.R., was accidentally killed at a naval air station on April 19th.

While flying at a fair height over Whitton Park, Twickenham, on April 24th, an aeroplane burst into flames, and fell to the ground, the pilot, a lieutenant in the R.F.C., being burnt to death.

An inquest was held on April 27th on 2nd Lieut. D. J. Barnes, R.F.C., who was killed on April 25th while flying in

Flying Services Fund Sub-Committee.

A Meeting of the Flying Services Fund Sub-Committee was held on Friday, the 27th ult., when there were present: Major T. O'B. Hubbard, R.F.C. (in the Chair), Squadron Commander C. E. Maude, R.N., and the Assistant Secretary.

Seven applications for assistance from the Fund were considered, and grants and allowances were recommended respectively:—

1. To a 2nd Class Air-Mechanic of the Royal Naval Air Service injured while on active service.
2. To a 1st Class Air-Mechanic of the Royal Naval Air Service incapacitated on active service.
3. To a 2nd Class Air-Mechanic of the Royal Flying Corps accidentally injured while on active service.
4. To a 2nd Class Air-Mechanic of the Royal Flying Corps incapacitated on active service.
5. To the Father of a 1st Class Air-Mechanic of the Royal Flying Corps killed on active service.

Club House.

The following prices have been fixed for the present by the Committee:—

Bedroom (including Bath)	5s. each per night.
Breakfast	2s. 6d.
House Luncheon	2s. 6d.
House Dinner	3s. 6d.

Billiard Room.

It is hoped that the Billiard Room will be ready this week.

Flying Services Fund.

Boxes for collecting subscriptions for the Flying Services Fund are now available, and anyone wishing to have a box can obtain the same on application to the Secretary.

Official Organ of the Club.

Owing to the shortage of paper, after the 12th inst. "FLIGHT" will only be sent to those Members intimating in writing to the Secretary that they wish to continue to receive the paper.

A reply post card has been sent to each Member. In the case of Members serving abroad sufficient time will be allowed for their replies to be received before action is taken.

THE FLYING SERVICES FUND administered by THE ROYAL AERO CLUB.

THE Flying Services Fund has been instituted by the Royal Aero Club for the benefit of officers and men of the Royal Naval Air Service and the Royal Flying Corps who are incapacitated on active service, and for the widows and dependants of those who are killed.

The fund is intended for the benefit of all ranks, but especially for petty officers, non-commissioned officers and men.

Forms of application for assistance can be obtained from the Royal Aero Club, 3, Clifford Street, New Bond Street, London, W. 1.

Subscriptions.

Total subscriptions received to May 2nd, 1917..

£	s.	d.
11,729	9	9

B. STEVENSON, Assistant Secretary.

3, Clifford Street, New Bond Street, W. 1.

Kent. The machine was observed to make a spinning nose dive from a height of 500 feet and as it struck the earth, burst into flames. A verdict of "Accidental Death" was returned.

A similar verdict was returned at an inquest held in East Kent on April 25th, on 2nd Lieut. A. W. Spence, R.F.C., who died in hospital as the result of an accident whilst flying.

Lieut. F. A. Clark was fatally injured in a smash at Streatham on April 29th. In endeavouring to land in a small field the machine collided with a tree and then the roof of a house, that of the father of the pilot. The wreckage burst into flames, and in removing his son from the wreck, Mr. Clark, senior, was badly burnt. Lieut. Clark died from his injuries later in the day.

While flying over Hull on April 30th a machine piloted by Air-Mech. A. J. Young, R.F.C., was seen to emerge from a cloud almost upside down. The machine fell into some allotments, and the pilot died from his injuries while being taken to hospital.

THE ROLL OF HONOUR.

Reported by the Admiralty:—

Killed.

Flight Lieut. G. R. S. Heming, R.N.
Flight Sub-Lieut. E. G. G. Jackson, R.N.
Flight Sub-Lieut. E. B. J. Walter, R.N.

Previously reported Missing, now presumed Killed.

Flight Sub-Lieut. C. T. Brimer, R.N.

Previously reported Prisoner of War, now reported Killed.

Flight Sub-Lieut. L. E. Smith, R.N.

Died of Injuries.

Flight Lieut. R. E. Bush, R.N.

Drowned.

Flight Sub-Lieut. G. D. Smith, R.N.

Seriously Injured.

Prob. Flight Officer E. D. B. Russell, R.N.

Injured.

Flight Sub-Lieut. W. E. McConnell, R.N.
Flight Lieut. (Sub-Lieut. R.N.) E. H. K. Turnour, R.N.

Prisoners of War.

Flight Sub-Lieut. H. Edwards, R.N.
Wing-Commander (Lieut.-Col. R.M.L.I.) C. E. H. Rathborne, R.N.

Reported by the War Office:—

Killed.

Major A. C. L. Geddes, M.C., R.F.C.
2nd Lieut. J. E. B. Hesketh, R.F.C.
Capt. G. B. Lockhart, Cyclist Batt. and R.F.C.
2nd Lieut. L. C. B. Sheppard, Somerset L.I., attd. R.F.C.
Lieut. J. M. Souter, Can. Gen. List, attd. R.F.C.
Capt. E. A. Twidale, R.F.A., attd. R.F.C.
Lieut. A. P. Wilson, R.F.C.
2nd Lieut. C. E. Wilson, R.F.C.

Previously reported Missing, now reported Killed.

2nd Lieut. C. S. Cranes, R.F.C.
2nd Lieut. R. W. M. Davies, N'land F., attd. R.F.C.
2nd Lieut. G. Everingham, R.F.C.
2nd Lieut. E. Hamilton, R.F.C.
Lieut. H. Loveland, Can. Inf., attd. R.F.C.
2nd Lieut. K. T. Mackenzie, A. and S. Hrs., attd. R.F.C.
2nd Lieut. D. A. McNeill, R.F.C.
2nd Lieut. T. J. Owen, R.F.C.
2nd Lieut. G. O. Smart, R.F.C.
2nd Lieut. J. C. D. Wordsworth, Durham L.I., and R.F.C.

Died of Wounds.

2nd Lieut. R. C. Cameron, R.F.C.
2nd Lieut. A. C. Young, R.F.C.

Previously reported Wounded, now reported**Died of Wounds.**

7653 1st Air-Mech. W. H. Bond, R.F.C.

Accidentally Killed.

941 Pte. C. N. Ryder, Australian F.C.
2nd Lieut. J. E. Shimmmin, Cyclist Co., Divisional Mounted Troops and R.F.C.

Died.

1064 Pte. A. Geary, Australian F.C.

Wounded.

2nd Lieut. F. S. Andrews, R.F.C.
2nd Lieut. W. R. Balden, R.F.C.
Lieut. L. F. Benyon, Monmouth and R.F.C.
2nd Lieut. L. W. Beal, R.F.C.
2nd Lieut. G. W. Berry, R.F.C.
2nd Lieut. H. S. Brackenbury, R.F.C.
2nd Lieut. H. C. Calney, A.S.C., attd. R.F.C.
Capt. L. C. Coates, London, attd. R.F.C.
2nd Lieut. J. C. Cotton, London and R.F.C.
2nd Lieut. L. A. Davies, R.F.C.
2nd Lieut. P. A. De Escofet, R.F.C.
Major R. L. Farley, R.F.C.
Lieut. W. F. Fletcher, R.F.C.
Lieut. W. Franklin, Dorset, attd. R.F.C.
2nd Lieut. W. Green, Black Watch and R.F.C.
Lieut. T. N. Jennings, R.F.C.
2nd Lieut. H. S. Lees-Smith, R.F.C.
Capt. K. C. McCallum, A. and S.H., and R.F.C.
Lieut. S. McKercher, Can. Inf., attd. R.F.C.
Lieut. C. N. Milligan, Can. Inf., attd. R.F.C.
2nd Lieut. J. J. Paine, R.F.C.
2nd Lieut. A. Pascoe, R.F.C.
Lieut. L. E. Porter, Can. Inf., attd. R.F.C.
2nd Lieut. A. G. Robertson, Black Watch and R.F.C.
Capt. E. J. D. Routh, K.R.R.C., attd. R.F.C.
Lieut. F. F. Wessel, Royal Fus., attd. R.F.C.
23050 2nd Air-Mech. J. T. Mackie, R.F.C.

Missing.

Capt. F. H. V. Bevan, R.F.C.
2nd Lieut. F. C. Craig, R.F.C.
2nd Lieut. A. E. Crisp, Norfolk and R.F.C.
2nd Lieut. R. E. Kimbell, Hussars, attd. R.F.C.
Lieut. T. Langwill, R.F.C.
Lieut. J. McElliott, Gen. List., attd. R.F.C.
2nd Lieut. J. P. C. Mitchell, Highland L.I., attd. R.F.C.
2nd Lieut. A. B. Morgan, R.F.C.
2nd Lieut. J. H. Muir, R.F.C.
2nd Lieut. G. A. Newenham, R.F.C.
2nd Lieut. D. N. Robertson, R.F.C.
2nd Lieut. C. V. de B. Rogers, R.F.C.
Lieut. G. R. Rogers, Can. F.A., attd. R.F.C.
2nd Lieut. F. Sadler, Durham L.I. and R.F.C.
2nd Lieut. L. A. T. Strange, Buffs (E. Kent) and R.F.C.
Lieut. B. J. Tolhurst, Duke of Wellington's, attd. R.F.C.
2nd Lieut. J. G. H. Trew, R.F.C.
Lieut. A. W. Wood, R.F.C.

Previously reported Missing, now reported Prisoners of War in German hands.

2nd Lieut. A. Holden, Yorks, attd. R.F.C.
2nd Lieut. A. G. Ryall, Durham L.I., attd. R.F.C.
2nd Lieut. C. A. R. Shum, R.F.C.
Lieut. H. S. Whiteside, Can. Mach. Gun Co., attd. R.F.C.

Correction.**Missing.**

Lieut. W. O. Russell, No. Staffs., attd. R.F.C., should read
Lieut. W. O. Russell, R.F.C.

**An Air Fight in Mesopotamia.**

Writing from Baghdad on April 24th, Mr. Edmund Candler says: "On the 22nd one of our airmen fought a successful duel with a hostile Halberstadt, with the result that the German pilot was killed and the machine destroyed. The enemy attacked first at 200 yards at an elevation of 7,500 feet. The British airman drew close in, travelling at the same level, and made a quick cart-wheel turn over the machine's tail, compelling it to dive. The enemy aeroplane descended at a terrific pace, and the British airman followed in pursuit less than 10 yards behind. After a few seconds fragments of the Hun machine flew apart, and the enemy pilot lost control. At 4,000 feet his two port wings broke off, and he fell to the ground two miles in front of the Turkish lines. The machine and body of the pilot are now in our possession."

Prominent French Pilot Missing.

CAPT. RENE DOUMER, of the French Flying Corps, son of Senator Paul Doumer, is reported missing. It is believed that he has been captured by the Germans. Two other sons of M. Doumer have lost their lives in the war.

Belgian Pilots Busy.

BELGIAN aviators made numerous reconnaissances over the enemy lines last week and more than a hundred chasing expeditions, in the course of which 20 air fights took place. Two enemy machines were brought down in the German lines.

An Aeroplane from British Guiana.

THE Crown Agents for the Colonies have received instructions to pay to the Central Committee of the Overseas Aircraft Club, on behalf of the Colony of British Guiana, the cost of a fully equipped aeroplane for presentation to the Royal Flying Corps.

The "Reprisal" Raid.

TRAVELLERS who have arrived in Zurich from Freiburg state that the effects of the Allies' reprisals raid were far more serious than has been reported. They say that many large buildings were entirely demolished, including the new university buildings and the new theatre, and that the main business streets also suffered severely from the bombardment and much property was destroyed.

AIRISMS

FROM THE FOUR WINDS

DAME RUMOUR is probably not far out when she classes the Kaiser as the head of the Weary Willies at the present moment. Judging from an incident described by Philip Gibbs, in the *Telegraph* last Tuesday, when writing from British Headquarters in France, the disease has caught on with no uncertain catch amongst at least some of the military followers of the Hun chief. Mr. Gibbs' Weary Willie under-study is thus pen-pictured:—

"On another part of the line held by English troops a queer bird was captured the other day. It was a blue bird in the form of a German officer wearing a gay uniform with a big cloak and spurs, brought down by one of our airmen. He seemed sleepy when caught, and yawned politely behind his closed hand, and explained the cause of his unfortunate advent behind our lines. It appears that the commanding officer of his air squadron at Cambrai went on leave, and his officers and other friends consoled themselves by drinking good red wine. In the morning, after a late night, they decided to go out on a reconnaissance, and the officer in the sky-blue cloak agreed that he also would make a flight, and so perform his duty to the Fatherland. A pilot took him up, but instead of making a reconnaissance he fell fast asleep, and saw nothing of a British aeroplane swooping upon him from a high cloud. A bullet in the petrol tank drove down the German machine, and the officer in the sky-blue cloak stepped out, saluted, surrendered, and a little later fell asleep again."

If there are many more of this pattern, there is good reason for Mr. Gibbs' following remark that, "an air prisoner is always more noticeable than the batches of infantry who come back to our lines after one of our attacks."

It is with sincere pleasure we learn that Capt. Leefe Robinson, V.C., is still in the land of the living, although, unfortunately, his present address is the land of the Hun, he having been taken prisoner after his recent forced landing on the enemy side. Mr. Stapleton Smith, whose daughter, Mrs. Whipple, is engaged to Capt. Robinson, further states that from a letter received by his fiancée, although a prisoner, he is not only alive, but well.

WOUNDED R.F.C. officers have now another haven in which to rest awhile through the generosity of Col. and Mrs. Mulliner, of Clifton Court, Rugby, who have given up their residence to the War Office, as a V.A.D. Hospital. The W.O. have decided to give the Flying Corps the benefit of this very welcome gift. Not only have Col. and Mrs. Mulliner presented the use of their house for this good purpose, but they have offered to entirely equip the new hospital, Mrs. Mulliner herself acting as Commandant, local ladies being enrolled to fill the ranks of V.A. Detachment for the building.

LORD DERBY will at Liverpool on May 12th open the Air Service Exhibition, with which Lady Drogheda is "touring" the country. The Lord Mayor of Liverpool will preside over the ceremony in the Walker Art Gallery, where, as mentioned a few weeks back, the Exhibition will be located. As we predicted, phenomenal success has attended the show at the various pitches where up to the present it has been possible to arrange the remarkable collection of relics, pictures, &c., associated with the Air Services.

AN interesting appointment announced in the *London Gazette* is that of Major Henry Fowler, R.E. (T.F.), the Superintendent of the Royal Aircraft Factory, to be a Lieut.-Col., R.F.C. (T.F.).

AMONG the Admiralty announcements of April 30th is the promotion of Squadron Commander Edward Featherstone Briggs, D.S.O., to be Wing Commander, to date December 31st. Quite a fitting compliment to commemorate his safe return to "Blighty."

WHILST we have every sympathy with the efforts of the representatives of the municipalities to induce, even at this late hour, the Government to take over damage from aircraft marauders as a national liability, we fancy the Mayor of Margate, at the Mansion House meeting last week, went a bit far in suggesting as one of his arguments that if "the vast amount of work which the insurance scheme entailed" were swept away, the result would be the releasing of men

sufficient to provide another division of the Army. As a fact the main work is done all in the day's work by the staffs of the various insurance companies, who, under the original scheme, have worked entirely on a small percentage.

PROFESSOR G. H. BRYAN, whenever he lectures, has something interesting and informative to pass on to his hearers. Last week, at the Royal Institution, when speaking upon the principles of aerial navigation and deploring the neglect on the part of British mathematicians to bring well-known formulæ to bear upon the solution of many problems affecting the stability of aeroplanes, Professor Bryan exhibited a photo. taken by him in Paris in 1877 of an experimental engine, and said that only during the past few days had he discovered on the mechanism the name of Blériot, then, of course, entirely unknown.

ANOTHER point which Professor Bryan emphasised, when referring to the danger of successive "banking," was that it might be found that an aeroplane with wings, the tips of which went downwards like a bird's, would overcome this.

A propos the Freiburg raid reprisal, it is worthy of careful note that the Queen of Sweden promptly sent a telegram to the Burgomaster of Freiburg expressing her deep sorrow for the air raid.

CARRYING mails by aeroplane is one of the certainties of the future foretold. Yet a "flying post" was started in 1763 in Exeter, to wit, Trewman's. Although the war has undoubtedly advanced aviation many decades earlier than it could ever otherwise have hoped to have attained, it has, unfortunately, been the means of killing *Trewman's Exeter Flying Post*, which last week, like many other newspapers these war-times, ceased further publication.

WHEN the aerial mail service between Naples and Sardinia and Sicily and Tripoli gets going, the "post-boys" will not unnaturally be fully armed. Aeroplanes will at first be employed, but presently the Italian Minister of Posts and Telegraphs proposes to use dirigibles. Looks as if it might easily become a permanency.

NOTHING could be more gratifying than the keen personal interest in aviation which is being evinced by the King. Last week it was the Sopwith firm which received a visit from His Majesty, and following this King George and Queen Mary, accompanied by Prince Albert and Princess Mary, and attended by Capt. B. Godfrey-Faussett, R.N., visited the Martinsyde aeroplane factory on Friday afternoon. Here the Royal party remained for quite two hours inspecting most minutely much of the work in operation, special note being made of the number of discharged soldiers who were usefully employed in the construction of the aeroplanes. Again, the "finished article" was seen in the air after the works had been thoroughly explored, and in the hands of that past-master in flying, Mr. Raynham, one of the Martinsyde products was put through its paces, giving some idea of what the machine is capable in practice. Altogether a delightful afternoon's experience.

PERHAPS it was only a coincidence that Lord and Lady Desborough, who are so intimately associated with matters aviatric, had the honour of dining with the King and Queen the same evening.

MORE Hun relics for local collections. A machine gun and part of the girder of a Zeppelin have been presented by the Aircraft Equipment Department to the Chelmsford collection of local war relics.

Similar collections are being made in various provincial towns, which appear to be favourably regarded by the Government as a means of preserving war relics for posterity.

A SIMILAR relic, which should be ear-marked for local claims, was on April 30th unearthed in a north Midland town, where Ralph Goodier, a farm hand, while ploughing up an allotment, brought to light an unexploded bomb bearing a Hun trade mark, which there is reason to believe was one of several "pips" left behind by a Zeppelin during an air raid last year.

Personals

UNDER the above heading will be published weekly particulars of a personal character relating to those who have fallen or have been wounded in the country's service, announcements of marriage and other items concerning members of the Flying Services and others well known in the world of aviation. We shall be pleased to receive for publication properly authenticated particulars suitable for this column.

Captain ARTHUR FORBES BAKER, of the Duke of Cornwall's Light Infantry, attached R.F.C., previously reported missing, but now officially stated to have been killed on April 11th, was the second son of Mr. F. W. Baker, of 10, De Vere Gardens, W. He was educated at Ashdown House, Forest Row, the School of Mines, Camborne, and Trinity Hall, Cambridge. In August, 1914, he was engaged in professional work in Siberia, and when war broke out returned immediately to England, and was gazetted in October to the D.C.L.I. In April, 1915, he left for the front, and remained with his regiment on active service until seconded to the R.F.C., acting as observer at the front for five months, after which he returned to England, and in July, 1916, received his certificate as pilot. He was employed for some time in a night flying squadron. He returned to the front in the late autumn, and in March of this year was gazetted flight commander. He was mentioned in despatches in 1915 for services while with his battalion.

Second Lieutenant C. T. L. DONALDSON, Yeomanry and R.F.C. (killed in action on April 14th), was 20 years of age, and son of the late Archibald Falconar Donaldson, of Donaldson Brothers, shipowners, Glasgow, and of Mrs. Donaldson. He had his Yeomanry commission in March, 1915, and was afterwards attached to the R.F.C.

Captain ARTHUR TYLSTON GREG, Cheshire Regiment, attached R.F.C., killed on April 23rd in an action in the air, was the eldest son of Colonel E. W. Greg, V.D. (commanding a Reserve Battalion of the Cheshire Regiment) and Mrs. E. W. Greg, of Norcliffe Hall, Styal, Cheshire. He was educated at Rugby School, where he was an officer in the O.T.C., and New College, Oxford. He matriculated at Oxford in March, 1913, and joined the O.T.C. In August, 1914, he received his commission, and proceeded to the Front in September, 1914. While there he was attached temporarily to the Sherwood Foresters, and did duty with that regiment until just before Christmas, 1914, when he was invalided home for a short time. On returning to the Front early in January, 1915, he was attached to a battalion of the Cheshire Regiment, with whom he remained until he was severely wounded on May 8th, 1915. On his recovery he rejoined his own battalion, and was promoted captain in November, 1915. Later he was appointed battalion bombing officer, and in September, 1916, he was selected as a candidate for the R.F.C. He received his training for this Corps in England and France, and was sent out for active service to France in April, 1917.

Lieutenant MARTIN A. LILLIS, Royal Irish Regiment, attached R.F.C., was the youngest son of Mr. Thomas Barry Lillis, managing director, Munster and Leinster Bank, and Mrs. Lillis, Carrig, Queenstown. He was educated at Clongowes Wood College and Trinity College, Dublin, where he took his degree, and was called to the Bar in 1913. He entered Sandhurst in 1914 after the outbreak of war, was attached to the R.F.C., and had been flying at the front since January, 1916. On one occasion, when 6,000 feet up over the German lines, he had the top of his engine blown away, and managed with great skill to bring his machine back to safety. He fell on April 11th, aged 26.

Second Lieutenant P. A. RUSSELL, Yeomanry, attached R.F.C., killed on April 2nd, was the second son of the late P. B. Russell, and of Mrs. Russell, of Lanton, Kirknewton, Northumberland, and was aged 28. Educated at Edinburgh Academy and Sherborne, he joined the Yeomanry on the outbreak of war, and later proceeded to Gallipoli, where he took part in the Suvla landing and the subsequent evacuation. He took his pilot's certificate in September, 1916, and proceeded to another Front in October, 1916. He was a member of the Duke of Buccleuch and North Northumberland Hunts, and was a prominent rider at the Border Hunt Steeplechase at Kelso.

The death from wounds received in action is reported of Second Lieutenant F. J. E. STAFFORD, R.F.C., eldest son of Mr. and Mrs. E. D. Stafford, of Brighton and Haywards Heath, and grandson of the late Alderman Stafford, formerly Mayor of Brighton.

Captain E. A. TWIDALE, R.F.A., attached R.F.C., killed on April 22nd, was the eldest son of Mr. Ashby Twidale, Niagara Falls, Ontario, and a grandson of the Rev. Joseph

Twidale, of Melton Mowbray. At the outbreak of war, he enlisted in the Canadian Forces in the Eaton machine-gun battery, in which he was made sergeant. While in England he was offered a commission in the R.F.A., which he accepted, and proceeding to the front in March, 1916, he was through the Somme advance and was promoted to captain in September, 1916. He joined the R.F.C. Kite Balloon Section last January. Captain Twidale was a B.Sc. of Toronto.

Lieutenant JOHN GEORGE WILL, R.F.C., who was posted as missing some weeks ago, is now reported to have been killed in action on March 25th. He was second son of Dr. and Mrs. Will, of Bethnall House, Cambridge Road, and won fame at Merchant Taylors' School and at Downing College, Cambridge, in both scholarship and sport. In Rugby football he possessed gifts for half and three-quarter back play that secured for him his Blue as a Freshman in the Cambridge Fifteen, and Caps for Scotland in the Scottish national matches of 1912 and 1914. His years in the Cambridge Fifteen were 1911, 1912 and 1913, and he was captain elect of the Cambridge R.F.U. when war broke out. In his Freshman's days at Cambridge Will played flying half, but afterwards he became a dashing left wing three-quarter, and played many great games in that position for Cambridge and for Scotland. Before joining the R.F.C. he served with the Leinsters, and was wounded.

Missing.

Captain CRATHORNE EDWARD ISHAM CHARLTON-ANNE (Bob), R.F.C., youngest son of Major and Mrs. Anne, of Burghwallis, Yorks, is reported missing, and believed to have been drowned on April 15th.

Married and to be Married.

An engagement is announced between ARTHUR JAMES ANNANDALE, Second Lieutenant, late Royal Irish Rifles, attached R.F.C., son of the late James Hunter Annandale, of Polton, Midlothian, and of Mrs. Annandale, and THEODORA LINDSAY, only child of Colonel A. L. CALDWELL, Army Service Corps, and Mrs. Caldwell, and grand-daughter of the late Right Rev. Bishop Caldwell.

A marriage has been arranged, and will shortly take place, between Lieutenant-Colonel Henry LE M. BROCK, D.S.O., Royal Warwickshire Regiment and R.F.C., third son of the Rev. and Mrs. H. Walter Brock, of St. Peter-in-the-Wood, Guernsey, and DAPHNE, elder daughter of Mr. and Mrs. CECIL A. CAREY, of Hauteville, Guernsey.

Captain CHARLES MURRAY PICKTHORN, M.C., R.F.C., second son of the late C. Wright Pickthorn and Mrs. Pickthorn, of West Kensington, was on April 28th at St. Mary's, Wimbledon, married to BESSIE DOROTHY BATTEN BELL, elder daughter of the late William Bell, of Belfast, and Mrs. Batten Bell, Wimbledon.

Items.

Wing Commander (Lieutenant Colonel, R.M.L.I.) CHARLES E. H. RATHBORNE, R.N., who was officially reported on April 29th to be a prisoner of war, is apparently the "lieutenant-colonel" who was announced by the Germans to have been captured during the reprisal raid on Freiburg on April 14th. Colonel Rathborne, who is an interpreter in German, was appointed for instruction at the Central Flying School in January, 1913, and subsequently served at Felixstowe Air Station, becoming a flight commander in August, 1913. During the present war he commanded a squadron of aircraft in the combined aeroplane and seaplane operations in the Bruges-Ostend-Zeebrugge district from February 11th to 16th, 1915.

A Requiem Mass for Squadron Commander JOHN PETRE, D.S.C., youngest son of Mr. Sebastian H. Petre, who lost his life in a flying accident abroad, took place at Ingatestone Hall on the 27th April. The congregation included officers of a bombing school and officers and men of the R.N.A.S. By a coincidence the service took place on the birthday of an elder brother, Edward Petre, a pioneer of aviation who lost his life in England five years ago. It is hoped to bring Commander Petre's body home after the war.

A memorial service for Lieutenant FRANK R. SEELY, eldest son of Brigadier-General the Right Hon. John B. Seely, M.P., formerly Secretary of State for War, was held on April 27th at Brooke Church, Isle of Wight.

AVIATION IN PARLIAMENT.

THE GOVERNMENT AND AIR POLICY.

In the House of Commons on April 26th a debate took place on the following motion: "That a sum, not exceeding £1,000, be granted to His Majesty, to defray the charge which will come in course of payment during the year ending March 31st, 1918, for the salaries and expenses of the Air Board."

The Parliamentary Secretary to the Air Board (Major Baird): I hope the Committee will think it a convenient arrangement if, before entering upon a discussion on the Air Board, I give a few facts concerning the composition and functions of that body. There has been no opportunity hitherto of explaining precisely what the Air Board is, and what are its duties. The present Air Board was created by a minute of the Cabinet on December 22nd last. It retained all the powers of the previous Air Board, with a certain number added. The Committee will remember that when the former Air Board was constituted, the Leader of the House referred to it as a necessary step in the development of what might eventually become an Air Ministry. The present Air Board is undoubtedly another step forward in that direction. I would ask hon. members to remember, if perhaps they are a little disappointed with the powers now exercised by the Air Board, that in proceeding, not only with a new arm, but with an arm which is of vital importance to both services, and which is fighting daily, it is absolutely necessary to avoid any rash experiments which might lead to a diminution, either of the output of machines or a dislocation of the activities of the services at the front. Therefore, it is essential to proceed cautiously.

The present composition of the Air Board is as follows: There is a President, Lord Cowdray, a Director-General of Military Aeronautics; there is the Fifth Sea Lord, who is Director of the Air Service at the Admiralty; a Controller of Aeronautical Supplies, who is an officer of munitions; there is a Controller of Petrol Engines, equally an officer of the Ministry of Munitions; and there is the Parliamentary Secretary, who, in the absence of the President, has to preside at the meetings of the board. The duties of the board may be summarised as follows: The Admiralty and the War Office concert their respective aerial policies in consultation with the Air Board. The Admiralty and the War Office formulate the aerial programmes required for the fulfilment of the approved policy. Then the Air Board decides the extent to which it is possible to meet that approved departmental programme. The Air Board selects and is responsible for the design of the aeroplanes and seaplanes and for their engines and accessories; the Board furnishes approved plans and specifications to the Controller of Aeronautical Supplies, and to the Ministry of Munitions, which is responsible for their production, and who subsequently hand them over for the use of the Air Service for which they are designed and manufactured. It is quite obvious that that arrangement is open to the criticism that too many cooks may spoil the broth. It is equally open to the contention that it fetters them. But if you have a stiff bill to climb four horses are better than two. For the success of our work two conditions are essential. First, that all the members of the Board should work in the closest harmony and co-operation—and that we have got to the utmost extent—and the second is what was not foreseen at the composition of the Air Board, but what has been achieved since: that everybody should be housed under the same roof. The idea of the Naval Air Service having to visit first of all the Air Board in one house, and then to go on to the Ministry of Munitions in another house, and of their correspondence having to be passed backwards and forwards by boxes, or through telephone, and so on, would have led to delay which in a service where it is absolutely indispensable that the user of the machine should be in constant daily communication of the closest nature with the producer of the machine would inevitably have led to disaster.

We might have got a larger number of standardised machines, but undoubtedly they would have been out of date at the time they were supplied. An essential feature of the present arrangement, therefore, is the fact that by securing the Hotel Cecil the Air Board has been enabled to house all its guests—the whole of the R.N.A.S., in so far as it is concerned with heavier-than-air machines, the whole of the R.F.C., and, of course, the whole of the service of the Controller of Aeronautical Supplies. They are not yet altogether in the building because a certain number of rooms, which are not yet at our disposal, have to be vacated, but this matter is going forward as rapidly as possible. In addition to that the Controller of petrol engines also has an office in the building. Criticism may be offered that this arrangement applies only to heavier-than-air machines. That is true. Therefore, it is suggested, it does not cover the whole ground of aeronautical activity. I would beg the House again to remember that we are in the middle of a war, and we are dealing with a great service, with an arm which is of the utmost importance to our forces, whether naval or military, at the front, and the Air Board covers the branch of the air arm which is common to both services. The army does not use lighter-than-air machines, and consequently there is no question of any competition between the army and navy in regard to manufacture. As seaplanes and aeroplanes are machines of the same nature they require the same materials for their construction. They are made in the same factory. They require the same transport. They require the same sort of labour. They employ the same kind of engines, and it is in these directions that a unification has been effected with a view not only to prevent any kind of overlapping, but with a view to using to the utmost possible extent the resources of the country for the benefit of the nation as a whole. I pass on from that brief description of what the Air Board is to the different sections which have taken up their headquarters in the Hotel Cecil. As I said, the Controller of Aeronautical Supplies, who is a member of the Air Board, undertakes the responsibility, on plans and specifications supplied by the Air Board, of producing the aircraft that are necessary for carrying out the programme of the two services. But design is a function of the Air Board itself, and it is the business of the Technical Department of the Air Board to settle upon designs of the aircraft which are used by the two services. That does not mean that the Technical Department designs aircraft. On the contrary, the Technical Department furnishes the designers of the country in connection with private firms with the requirements of the two services as sent home from the front. The designers of the manufacturers of the country are supplied with the lists of the specifications, and those designs are received by the Technical Department of the Air Board, specifications are checked and calculated, and they are considered in the light of the best technical experience available. Experimental machines are then ordered for trial.

The head of the Technical Department of the Air Board, Brigadier-General Fisher, was nominated unanimously by both the Director-General of Aeronautical Supplies and the Fifth Sea Lord, who agree that he is the best man for the post. He is not only a very experienced pilot, but he has commanded a wing at the front, and he is therefore in close touch with the requirements of pilots at the front, and he knows what the technical and manufacturing difficulties are from the point of view of the man who has to keep his wing up at the front. The Deputy-Controller of the Technical Department is Captain Groves, of the Royal Navy, who is a Wing Captain in the R.N.A.S., and who, in addition to a long experience—long as far as anything can be said to be in connection with aeronautics—has had considerable experience at the Admiralty and commanded a naval wing abroad. Therefore, we are fortunate in having in these two officers able men in the closest touch with their brother officers

in the services, whose technical attainments are admitted by all who are competent to judge to be perfectly satisfactory and adequate to the discharge of those functions. In this technical branch they examine the designs, consider them and report on them to the Air Board, and it is the function of the Air Board to decide whether a design is to be adopted or not. That is the joint responsibility which falls on all members of the Air Board. It comprises, as I have said, the head of the Naval Air Service, the head of the R.F.C. (Military Branch), and the Controller of Aeronautical Supplies, who looks at the thing from the manufacturing point of view, and we are in possession of the requirements of the services at the front, and we have to make up our minds what machines shall be ordered, and in what number.

One of the chief functions of the Technical Department is to arrive, as far as possible, at a common specification and standardisation of the machines used by the army and by the navy. For no very apparent reason, it has occurred in the past that machines of precisely the same type used by the Naval Air Service are different from machines of the same type made for the R.F.C., and consequently, if the two happen to be serving together, interchangeability is not possible, and there is an inevitable waste of resources. That branch of standardisation is being developed by our Technical Department, as far as it is possible to do it. Of course, I do not wish the House to carry away the impression that we are endeavouring to standardise machines on a large scale, because nothing, I believe, could be more fatal than that. You might standardise machines, and get vast quantities of them, and when you had them they would be out of date, and you would be better off with one-tenth of the number of up-to-date machines. Therefore, I do not want there to be any misconception as to the extent of standardisation which is being carried out. It has been carried out in this instance: It used to be the practice for the speed indicators fitted to an aeroplane that was flown by an officer in a blue coat to have the speed marked in knots, but the same machine flown by an officer in a yellow or a brown coat had the speed indicator with the speed marked in miles. That seemed to be an unnecessary duplication, and, therefore, military machines are having their speed indicators marked in miles, and the seaplanes have their speedometers marked in knots. That is only reasonable, as it is the system used on the sea. There are a few other points of that sort. Standardisation, so far as it is possible to be carried out is being carried out to the utmost possible extent.

Let me say, further, that there is a very close liaison maintained between the Technical Department of the Headquarters at the front, and the Naval Branch of the Air Board. There is a constant interchange of visits between competent officers, with a view to eliminating delays as far as possible, and in order to enable modifications desired by the pilots at the front to be produced in the machines, and at the same time keep in London in close touch with the general requirements of the services at the front. Then, as regards the production of experimental machines, there also the Technical Department has access to the manufacturer through the Director of Aeronautical Supplies. The Committee will realise that production in quantity and production of experimental machines are two quite separate departments of commercial activity, and nothing retards production on a large scale more than confusing the two, and insisting on a machine being put on a productive scale into a shop before you have got the machine entirely satisfactory for use. Therefore, every effort is made to keep quite distinct the experimental section of the manufacturers from the production section of the manufacturers, which is devoted to productions on a large scale. Communications from inventors are, for the moment, dealt with by the Technical Department of the Air Board, but we are in process of creating a Department specially designed for the purpose of dealing with inventions, and for that purpose we are calling upon, and hope to secure the services of the officers and others who have been employed in the Invention, Section of the Ministry of Munitions, the Admiralty, and War Office, in so far as they relate to aircraft. The proposal is—it is only a question of arranging the thing—to amalgamate all those three bodies of competent people dealing with invention, so that they should form a branch of our Air Board.

As regards the Royal Aircraft Factory, that is considered from the point of view of the Air Board as precisely on the same footing as other manufacturers. It is under the Controller of Aeronautical Supplies. There is at the head of it Mr. Henry Fowler, who rendered great service in connection with the production of munitions. I shall have rather more to say about the Royal Aircraft Factory when I come to the Department of the Controller-General of Supplies. Lastly, the Technical Department is in constant and close communication with manufacturers. A society of manufacturers has been formed, and both through them and through individual manufacturers the Technical Department keeps in the closest possible touch with the trade. It is hardly possible to go to the Department without finding manufacturers and designers in constant and daily touch with the officers of that Department. I would add that the same close liaison is established between our Technical Department and the corresponding Department of our French Allies, and we are now arranging in the same way with our new Ally, America. Therefore, I think the Committee will agree that, in so far as co-operation and co-ordination between the Allies are possible, a great advance has been made.

With regard to the Controller of Aeronautical Supplies, I would like to draw the attention of the Committee to the magnitude of the business with which he has to deal. I have been furnished with a list of 958 firms engaged on work for the Directorate of Aeronautical Supplies. Of these, 301 are direct contractors, and 657 are sub-contractors. In addition, there are a very considerable number of sub-contracting firms of whom we never hear, unless they have troubles in regard to labour or material. The total number of hands employed by the fifty firms of most importance is 66,700. It may interest the Committee to know that dilution has been carried out to the extent of 31 per cent. in those firms, and by dilution I mean the employment of women and males under military age. It is, of course, necessary to remember that that degree of dilution does not help manufacturers. It is a sacrifice that had to be made, but when you take a quite new industry like the aeronautical industry, which requires the very greatest skill that can be produced, I think it is fair to say that it speaks well, both for the manufacturers and the organisation, that it has been possible to carry on that business and combine this very high degree of dilution.

There is one point which it may be well for me to refer to now, and that is the recent Order issued by the Minister of Munitions concerning the manufacture of experimental aeroplanes. That Order is in no way intended to impede progress, but, on the contrary, to directly facilitate it. It is now necessary to obtain a licence in order to be able to manufacture experimental aeroplanes. We have no desire to hamper the genius and ingenuity of those who think they have machines which are going to be of service in the field. On the contrary, we want all the inventions we can get, but there are a very large number—in fact, an immense proportion—of inventions which, although their creators believe they are bound to revolutionise aeronautics, or anything else, when they are judged by practical men, it is perfectly obvious that they are of little use. It is to prevent the waste of material, time, and labour on inventions which have no prospect of proving useful to the country that this Order has been issued.

The applications for licences afford the Technical Department the opportunity of knowing what has been done in the country, and guidance and help can thereby be extended to all hopeful propositions. At the same time, an opportunity is afforded of refusing permission in the case of useless proposals. A number of examples could be quoted illustrating these points.

As regards the Royal Aircraft Factory, from the point of view of the Air Board, this factory is now regarded in the same light as the private contractor. Any designs which it may prepare are subject to exactly the same technical criticism as those of a private firm. The factory is under the direct charge of the Ministry of Munitions, and is utilised for detail experimental work, which is carried out under the requisitions of the Technical Department of the Air Board. In addition, repair work is carried on, together with miscellaneous urgent requirements. Either in the way of alteration or manufacture it may suddenly become necessary to produce one particular type or any of the hundred and one standards or things required for manufacture, and time is saved by having that work done at the Royal Aircraft Factory, and that is the kind of work that is being done there.

Mr. Joynton-Hicks: By miscellaneous requirements, I take it the hon. member does not mean the manufacture of a complete aeroplane?

Major Baird: Certainly, I do, because it is often possible to get out the first lot of a new design of an aeroplane quicker from the factory than it would be if we had to wait for the manufacturer who is going to bring them out. It is our practice, and I think it is a very wise one, to get from the Royal Aircraft Factory the first number as quickly as possible of the new type of machine which there are not facilities for making elsewhere, and to that extent it is a miscellaneous requirement. Under the new arrangement, the Aeronautical Supply Department, being under the Supply Department of the Ministry of Munitions, benefits directly as regards the many and varied activities of the other Departments of the Ministry; for instance, priority, raw material, machine tools, labour, &c. In addition to these, many additional facilities have been provided for the carrying out of aeronautical supplies. That applies to all the factories. When I come to the question of affording additional facilities, a subject in which the hon. member for Brentford (Mr. Joynton-Hicks) is much interested is the adaptation of factories which, owing to changes in the programme of the manufacture of munitions, may become available for employing in the aircraft industry. That policy is carried on so far as possible, but it can only be carried out to a limited extent. Considerable investigations have to be carried out as to the nature of the machines and the character of the work done in the factories when they were used in their former occupation. Every possible use is being made of those factories, but there are very distinct limitations to any very definite extension in this direction on account of the difficulties which I have mentioned.

Mr. Butcher: Can the hon. and gallant gentleman tell the Committee whether any changes have been made in the Royal Aircraft Factory as regards experimental trials and research?

Major Baird: No essential difference has been made, and there is a branch carrying out experiments of every kind at the present time, and it is a very valuable branch. It is necessary to point out that aeroplane construction and aeroplane engine construction are industries entirely built up during the War, involving highly technical processes, great precision and accuracy in machining work, and a necessity for the most accurate machine tools and the most highly specialised materials, involving the most modern metallurgical processes. This work has largely had to be carried out with a very small nucleus of skilled labour, and consequently a very large percentage of unskilled and female labour, involving long training and fairly long periods of inefficient production. The use of such diluted labour necessarily calls for the closest degree of inspection. I did not mean to say that we turned out bad machines, but simply smaller quantities than we otherwise should if we had more efficient labour. It does not matter to us who the machine is turned out by as long as it can satisfy a certain test. It is a question of labour, and it is no disgrace to the labour that it was not then efficient.

The engines are tested at the manufacturers by the Aeronautical Inspection Department under the Aeronautical Supplies Department. The Minister of Munitions is responsible for the quality of the machines produced, and consequently that Minister must have at his disposal the services of the skilled inspectors who have been employed hitherto. Certain modifications have been made in the exact nature of the inspection—that is to say, the principle of inspecting individual parts rather than the inspection of the finished article is being rather extended now. An effort is being made to place men in the factories, whose attainments are sufficiently strong to warrant them being given rather greater latitude in assisting the manufacture than would be possible when you had to depend on unskilled inspectors who discharged their function by a mechanical process. The inspection is now carried out at the works, and the machines are taken over by the Naval Air Service and the R.F.C. at the floor of the works, and they are flown away by representatives of those services. The Air Board is responsible for the machines, and the Minister of Munitions is responsible for the design and delivery.

Mr. Billing: Am I to understand that these machines are delivered without any air test? Do the Air Services take them over without the air test and only after inspection?

Major Baird: That is so.

The functions and composition of the Air Board are well known to hon. members. We are responsible for the machines until they leave the factory. They are then taken over by the R.N.A.S. and the R.F.C. at the factory, and the reason for this is pretty obvious. It is that they are flying men and we are not, and, having their own stock of flying men, they prefer this arrangement, which also suits them best. With regard to the ratio of the increase in production, the Committee will realise that it is quite impossible to give definite figures with regard to what we are producing. But it is possible to give a ratio, and I rather hope that the Committee will be satisfied that the ratio will indicate satisfactorily an improvement in the matter of production. Taking the average monthly output of last year in the arbitrary figure of eight, the output for the first two months of this year, January and February, was sixteen, the anticipated output for the next three months is nineteen, and we hope by the end of the year to have doubled that, or very nearly to have doubled it. Let me say also—and this is a point which the Controller of Aeronautical Supplies desires to be realised—that it would be most unjust to forget that those who have had the duty of supplying the aeronautical requirements of the two Services up to the present are solely and entirely responsible for that very satisfactory increase. Anything that can be done by new arrangements which did not come into force until this year cannot show any appreciable effect certainly until the latter half or the third quarter. That is a point which ought to be remembered when people are prone, and I think very unjustly prone, to criticise the arrangements previously made for production. It is only fair to remember that that very substantial increase is entirely due to the energy and foresight displayed by those whom we have now succeeded.

There is another point which ought also to be remembered. We are under a very large debt of gratitude to our French Allies for the assistance which we have received from them, not only at the beginning of the war, when we had to rely upon them to an enormous and even an appalling extent for our aerial equipment, but for assistance of a very valuable character which we are constantly receiving from them. We hope that it is not altogether one-sided; but they organised their Air Service before we organised ours, and there is no doubt that they are rendering us invaluable service to-day. Our

relations, I am pleased to say, are of the most cordial and satisfactory kind. Before leaving altogether this question of the manufacture, I would point out to hon. Members what a complicated thing an aeroplane is. Sir William Weir tells me that the number of separate pieces in a modern aeroplane, exclusive of the engine, is 2,234. When you come to think with what accuracy each one of those pieces has got to be made, using only the very best material—consequently, a large proportion of rejections is inevitable—and how the very best skill must be exercised in order to put those pieces together, you do get some idea what a complicated and difficult job is this aeronautical business. Then he also points out that there is probably a wider range of materials than in any other manufacture of munitions, covering the finest timber, the highest qualities of alloy steels, textiles, mechanical instruments, guns, making demands on the widest range of industries. To afford a slight example of the new facilities which require to be provided and the character of the provisions to be made, the following may be cited. It is necessary to obtain assurance of satisfactory deliveries of flax seed for the flax crop in Ireland. Hon. members may be surprised to learn that is important, but it is a matter of vast importance. It has, moreover, been necessary to build up the magneto industry in this country entirely. Before the war we were dependent upon foreign supplies. Lastly, new chemical works have had to be erected for the manufacture of dope to render us independent of imported supplies. Those are only very small instances of the wide range covered by aeronautical supplies.

I pass now from this question of supplies to another field of activity of the Air Board. Although its functions are restricted to heavier-than-air machines and although it has nothing to do with operations, the Air Board does have the duty of considering air policy, and in connection with air policy it appeared to the Board, and it has been approved by the Prime Minister, that it should be our duty to investigate the question of aerial civil transport after the war. It will be apparent to hon. members that when the war comes to an end, there will be not only a vast number of highly skilled pilots, but there will be a large number of aeroplanes in the hands of the Services, and a still vaster number of aeroplanes and aerial engines on order. I have quoted the number of people engaged in the air industry to-day. They are more likely to increase than diminish. This whole great industry has been built up for the purposes of the war, to make use in warfare of an element which certainly cannot be neglected in peace. Therefore, it does not appear to be unreasonable that the Air Board should take up as a subject of inquiry as far as possible the uses that can be made of aircraft after the war, and for that purpose it has been decided to institute a Committee of which Lord Northcliffe has been asked to take the chair, and has accepted, and it is proposed that the Committee should comprise representatives not only of the two Services and of the Air Board, but also of the Board of Trade, the Post Office, the Foreign Office, the Colonial Office, the Customs, and the Treasury, representatives from the Dominions, representatives of course of the manufacturers and designers in this country, and obviously it would be desirable that Parliament should also be represented. The terms of reference are as follows:

"To consider and report to the Air Board with regard to:—

"(1) The steps which should be taken with a view to the development and regulation, after the war, of aviation for civil and commercial purposes, from a domestic, an Imperial, and an international standpoint.

"(2) The extent to which it will be possible to utilise for the above purpose the trained personnel and the aircraft the conclusion of peace may leave surplus to the requirements of the Naval and Military Air Services of the United Kingdom and Overseas Dominions."

The proceedings of the Committee to a large extent will have to be confidential. The Committee, I would remind hon. members, corresponds to a similar body which has already been created in France under the presidency of M. d'Aubigny. It was set up by the Ministry of Commerce and was appointed to consider the routes to be followed in France, the Colonies, and in Allied countries, type of machine to be employed, type of postal car or carrier, bases, relay stations, and the recruitment of the personnel, as well as the question of the purchase of hangars, aeroplanes, motors, &c., for the military authorities. I trust the Committee will agree that this was a branch of the subject which ought to be tackled. It is only necessary to exercise very little imagination to realise what far-reaching and vast opportunities may offer for the development of the Empire. I would ask the Committee to remember—and I submit this for their consideration—how necessary it is to be careful, in criticising any branch of military or naval service, that you do not give to the enemy information which we should be delighted to have with regard to his service. It would be most unbecoming on my part to endeavour, and I do not seek to endeavour, to induce members to refrain from criticism. Everybody is a judge of what is warrantable and what is unwarrantable criticism, but I think it fair to suggest, as regards the Air Service, that criticism ought to be limited in precisely the same way as it is limited with regard to guns, or types of guns, or equipment of any other kind. There really is no justification for thinking that we, as laymen, and we are all laymen, are more competent to criticise aircraft, or the use of aircraft, than we are to criticise types of guns, or submarines, or destroyers. The danger is that you will give to the enemy information which it is very desirable that he should learn in one place and one place only, and that is in the air. The effort of the Air Board is and ought to be to secure that that information which the Germans will derive from our airmen shall be even more disagreeable in the future than it has been in the past, and I do not think that they have had much to smile about during the past week or ten days. Nobody denies that criticism can have a very stimulating effect, but as regards aeronautics it can have another effect. It can have the effect of reducing, or diminishing or destroying, the confidence of an airman in the machine which he has got to fly, and there is no more certain way of killing a man than to send him up in a machine which for one reason or another he believes to be unsound.

I want to take advantage of this opportunity to modify, or to explain, an answer which I gave to the hon. member for East Herts (Mr. Billing) yesterday. I think it gives an example of the dangers, and to some degree of the uselessness, of a certain kind of criticism. The hon. member asked me, as he was perfectly entitled to do, whether a certain type of machine was used for long range bombing, and I replied, on perfectly competent authority, that the machine which they use normally for gun spotting and artillery reconnaissance was on certain occasions used for long-range bombing. The hon. member, I think, said, "Are these machines considered fit to send on a long journey?" I replied, "They are considered fit by the officers who send them out." Let me qualify that answer. It is perfectly true that the officers would not send out these machines if they did not consider them fit for the job, and the proof that they are fit for the job is that they have done it; but I do not deny that if they had other machines they would send them out in preference. That is a point which hon. members who have not been on active service may find it difficult to realise. It is inevitable that in every campaign there comes a moment when you do not have to ask, "Is this the best thing for the particular job?" but where you have to use every man and every machine you possess in order to defeat the enemy. My answer to the hon. member yesterday was not of a character which covered the whole ground, and I invited him not to continue that form of criticism, but to reserve his energies for a subsequent occasion. Is this House going to dictate to officers in the field how they are to use the material sent out to them? You cannot do it. You would then get into the range of operations, and once you do that, you must have absolute confidence in the officers who are in the command of our forces in the field, so long as they show that they are worthy of that confidence. The idea that

we here can interfere with the use made of the machines we send out is really untenable.

Mr. Billing: As the hon. and gallant gentleman has referred definitely to a question which I raised I should like to take this opportunity of replying. [Hon. Members: "No, no!"] He has referred to a question which I asked yesterday, and I would suggest that he has put words into my mouth which I never used. I must ask you, Mr. Maclean, for an opportunity now of putting the case as it was put yesterday, or for an opportunity of doing so when the hon. and gallant gentleman sits down. I trust you, sir, will give me an early opportunity of replying to that point.

Major Baird: If I have misrepresented the hon. member I shall be only too glad to have it pointed out. As a general rule, we cannot interfere in this House with operations so far as aircraft are concerned. If the hon. member or anybody else asks, Are we satisfied with the machines we have at the front? I say plainly, No, we are not. We have endeavoured to improve the machines. To go on clamouring for the production of certain kinds of machines in substitution for the machines we have does not help. Nobody imagines that a suggestion which may be made in this Committee to-day with regard to a machine can be brought into effect to-morrow. The changes which are now taking place are the results of measures taken months and months ago, and any changes we are now planning in our air services cannot take effect until months and months ahead. It is not in the interests of the country to represent our machines as being unsuitable for the work which they are performing, when you know that these machines cannot be replaced at once, when you know that those machines are being replaced as rapidly as can be, and when you know that, however inadequate those machines may be, the duties performed by our air services are second to none in the whole field of operations. The question really is whether or not the work is being done properly. It is our business to secure that the officers in the field shall have the very best material we can produce. That is agreed. All our efforts are being made to that end. I would remind hon. members that whereas ginger may be a very good thing, they must not think that they are the people who have a monopoly of that very useful article. We have it supplied also from the front. Hon. members must not imagine that we do not hear of requirements and suggestions from the front as well as from this House. Hon. members may be quite certain that long before they raise points here with regard to machines, those points have been raised, probably weeks and months before, by competent officers who have visited the front. The only other question with which I have to deal is that of the mastery of the air. I do not know who invented the expression, but it has absolutely very little meaning.

Mr. Joynson-Hicks: I think I did. I have tried to get it for years.

Major Baird: Perhaps the hon. member will tell us what he means by it. I can tell him that there is no such thing as mastery of the air, for the reason that the air is not only a very big place, but that it is getting bigger every day. That is explained when you realise that if from being able to get up to 10,000 feet you are able to get up to 20,000 feet you have extended the air by 10,000 feet. In that sense it is true to say that the air is getting bigger every day. However numerous your machines or your patrols, nobody can pretend that you can patrol a strip of air 100 miles long and five miles deep in such a way as to make it impossible for the enemy to get through your patrol. It is not wise to endeavour to impress upon people the idea that aerial mastery is going infallibly to prevent any enemy aircraft getting through. The thing is impossible. Therefore, if we should receive visits from the Germans from time to time, we have got to put up with them to a certain extent. It is not fair to lead people to believe that you can give them that protection which they cannot be given. It would be very unwise to withdraw from useful and effective work a number of machines merely in order to do the work of reassuring people at home. You might have a large number of machines waiting here on patrol duty to meet possible and hypothetical raids, when you know that it would provide inadequate protection and that those machines might be better employed elsewhere. I think it is wise to say a word or two of warning on that matter.

What you can do in the air, and what is being done in the air, is to ensure that our men shall enjoy a degree of predominance sufficient to enable them to carry out their duties and to prevent the Germans from carrying out their duties. That has happened and is happening. So long as that state of affairs exists, I am bound to say it is as much as we can expect. The men are carrying out their functions. They are not satisfied, and we are not satisfied, with the machines we have got. We never have been satisfied, and I do not suppose we ever shall be, for the reason that you can either have a service with the very best machines, in which case you will have very few of them, or you may have a service comprising second-rate machines, in which case you can have a great many of them, or you can have a service combining both, in which case you will have the advantage of both. That is exactly what we have. To have nothing but first-rate machines, which implies their immediate substitution for the machines which are in use, is not really a practical proposition. It does not lead to any useful result and is likely to produce among the pilots a degree of discontent and a degree of lack of confidence in their machines which is not wise. Let hon. members remember that, although very good machines may be produced, you will always have to continue to produce large numbers of slow, obsolete machines in order to enable the pilots to be trained. You must bring up your pilots step by step. It is necessary to do what is accepted and well-known by competent judges in this matter, namely, produce slow and obsolete machines in order to train your pilots efficiently up to the highest point.

Mr. Montagu: My sole object in rising is to say something on only one part of the subject—because I know nothing about the air—the part of the subject which deals with the supply of machines. My hon. and gallant friend will admit that all through the earlier stages of the history of this matter the Ministry of Munitions gave all possible assistance in its power to the needs of the air services, conflicting though they often did with the needs of other supplies. Of course, it was recognised that the needs of the air services must come first, and that every effort must be made to meet their demands. The old system of things was very inefficient and wasteful, and led to the greatest possible delays in the equipment of the air services. It was for that reason that, during the time I was at the Ministry of Munitions, the whole of those interested in the matter united in their demand that the Navy should not build aeroplanes for itself and the Army for itself, but that we, who had to deal with petrol engines, motor lorries and with the same firms that were making aeroplanes, should be entrusted with the responsible task for which we thought our organisation fitted us: of supplying everything for everybody. During war-time, at any rate, there is no time for writing letters and red-tape. Let us never face a war again—if there be another war—let us never face peace again, with the departmental spirit in the Navy and the Army competing against one another. The Ministry of Munitions began with small things, and, growing from day to day, is beginning to be a Ministry of Supply. I hope such a Ministry of Supply has come to exist as a permanent part of our organisation.

Mr. Joynson-Hicks: I should like also to congratulate the Parliamentary Secretary especially, and the Air Board also, upon the suggestion he has outlined of the new Committee under the aegis of Lord Northcliffe—than whom I do not think one could have a better man, for he has been so keenly interested in flying for so many years—to consider the naval and military and commercial side of flying so soon as the war is over. I am only too glad to think that a Committee is to be formed, for there is need for a large amount of work to be done.

Major Baird: The Committee is to consider the civil side of aviation.

Mr. Joynson-Hicks: Still, I am very glad that a Committee is to be formed to consider the civil side of aviation. There is quite enough work in connection with that to provide the Committee with plenty to do for a good many months. At the same time, I hope the enormous advance which is bound to take place in the next few years in naval and military aviation will not be overlooked, and that someone will appoint a Committee, or that somebody will be appointed whose duty it will be to look after that, and not leave us in the parlous position in which we were when the war began. In regard to the licences for the manufacture of experimental aeroplanes, I hope and trust those licences will be freely granted. I know that in time of war one cannot press too strongly the right of the individual inventor, and I hope these licences will be freely granted, and that no inventor will be crabbed, however absurd his ideas may be to the minds of those in the Air Service, because it is out of absurd ideas that very often brilliant inventions result. The utmost facilities should be given to those who desire to manufacture new inventions in the shape of aeroplanes.

I do not intend to indulge in any random criticism, nor do I want to indulge in hostile criticism. My hon. and gallant friend has put us in a difficulty in regard to objections and criticism. At the same time, the Parliamentary Air Committee and we cannot be unmindful of the grave anxiety that there is at the present time in regard to certain machines at the front. I will call them A and B. I do not want to mention them particularly, but there is anxiety with regard to the casualties from time to time. Numbers have been kept from us by the Under-Secretary of State for War, but I venture to suggest that secrecy in the House of Commons means publicity outside. Through the Press, through correspondence, through wounded men coming back, the facts filter through, and the country gradually begins to realise what machines are good and what are bad, and what the state of affairs at the front is. When Lord Cowdray was appointed there was a strong consensus of opinion that we had got the right man at last, and that Lord Cowdray was going to have the real powers of a real Air Minister. I admire my hon. and gallant friend's candour in making the remarks he did in regard to the powers of the previous Air Board. Now at last we have in Lord Cowdray an Air Minister in whom are concentrated all the civilian powers which have been previously exercised in regard not only to manufacture, but in regard to the civilian control of both the Air Services.

General Henderson stated last week at Birmingham that neither command nor mastery of the air had any existence. On the other hand, I think I am right in saying that General Smuts at Edinburgh stated we have got mastery of the air. Personally, I agree with General Henderson. I do not think that up to the present there has ever been mastery or command of the air by either belligerent in this war. The object of the Committee and of those of us who have for years been interested in the Air Service is that we should get the mastery or command of the air. What I mean by command of the air is this: we should have in relation to the air exactly what the Royal Navy has in relation to the sea. I leave out for the moment the question of submarines, which is quite a distinct point. I think it perfectly possible for us to have in the same way and in the same sense command of the air. I want to be able to block enemy machines from coming out of their aerodromes. I want to be able to prevent them spotting for artillery. I want to be able to prevent them sending over airships here in order to carry out raids on innocent people. I want to prevent them sending over their aeroplanes here to drop, not very harmful, but unpleasant, bombs on our East Coast towns. I think that is possible if we have such a predominance in numbers as will ensure it. We have the predominance in men. There is no question about that among any of us. I have never said in any of the speeches I have made on this subject, and I am not going to say this afternoon—I am sure the House will bear me out—one word in criticism of the morale, bravery and devotion of our airmen. That is absolutely beyond any words. They are the super-heroes of the war, and, inasmuch as they are so brave, so brilliant and so determined, it is for us to see that we give them the very best machines that they can possibly have.

What is the position with regard to mastery or supremacy of the air at the present time? On March 7th the Under-Secretary of State for War was asked by my right hon. friend the member for Kirkcaldy (Sir H. Dalziel), "Can he assure us we still maintain mastery of the air on the Western Front?" "I think I can make that assurance," said my hon. friend. On March 13th he rather modified that statement, "There has not at any time on any side of the Western theatre been a situation which can properly be described as mastery or supremacy in the air," he said. I am rather inclined to doubt that. I think there was a time when we had the supremacy in the air. If you read the despatches from France from the Commander-in-Chief in the spring of 1916 to the summer of 1916 and at the commencement of the Somme offensive in July, 1916, you will see that we undoubtedly had a distinct and total supremacy of the air on the Western Front. We had all last summer a distinct supremacy. We smashed the German aeroplanes down, we prevented their artillery from having the advantage of efficient air observation, and at the same time our men went over their line and brought back at much less cost than they are doing to-day large numbers of photographs and records of observation. They will go on doing it, however costly it may be. Our brave airmen care nothing for losses. Whatever the cost they get the information. Our men, as we learn from a recent report, brought back in one day 1,700 photographs, but I am afraid they are doing this at a greater cost than in 1916. We have not the same supremacy on the Western Front that we had during the whole summer of 1916. The reason is this. My hon. friend went on to say:—

"The War Office is satisfied for the moment with the best types which are being employed, but there are machines still in use of types which are not up to the latest standard. These are being replaced as rapidly as possible."

What does that mean? The War Office is satisfied with the best types which are being used. So am I. Our best machines are equal, or superior, to the best German machines. There is no question about that. But what proportion of these best machines have we got at the front to-day? I will not give any figures, but I will hazard—and I think I am not very far wrong—that we have at the front to-day 4 per cent. of our machines of the best type, that we have at the front to-day 4 per cent. of our machines of the best type, as being superior to anything of the Germans. Can he or the Air Board tell me that there is any possibility of, I will not say 100 per cent., but 50 per cent. of our machines at the front being replaced by the best type of machines, such as he and I have in our minds during the course of the coming summer? I am afraid not. I am afraid it might have been done if it had not been for the confusion and the lack of driving force in the last two Air Boards or Air Committees, or whatever they are called. Has Lord Cowdray the power that he ought to have? Is he in any degree nearer being an Air Minister? Have we taken a step forward or is he merely in the same position as Lord Derby and Lord Curzon and Lord Montagu were in reference to the previous Air Board or Committee, which I fear were not very much good, in the autumn of last year? The public believes in Lord Cowdray, firstly, because of what he is, because he has great powers, great organising ability, and great driving powers, but also because they believe he has the power to do things. They believe he is really in control. Let me ask whether he really has any effective control with regard to the Air Services at all? Lord Cowdray and the Air Board have no power whatever to move a man or move an aeroplane which belongs to the R.F.C. Exactly the same is the case with regard to the R.N.A.S. Then I ought also to mention that the lighter-than-airship side has never come under Lord Cowdray or the Air Board at all. They have nothing to do with

it, and when we wonder whether we are going to have any Zeppelins to meet Zeppelins—the German Zeppelin menace is not yet finished, and in all probability we shall have them over again—and when, after two and a half years of war, I want to know who is responsible for the fact that we are not able to meet like with like, I am not entitled to go to Lord Cowdray at all. He says it is nothing to do with him, and I have to go to the Financial Secretary to the Admiralty and ask him why there are no English Zeppelins to compete with German Zeppelins. Then, not merely are these two Services under separate heads, but there is no interchange between officers of the R.F.C. and the R.N.A.S. I hope and believe that Lord Cowdray and my hon. and gallant friend can act as friendly go-betweens between the services and modify differences between them, but there is no power to say to this service, "Do this, and you must do it," or to the other, "You must come in closer touch." They can only say, "We hope you will accept our recommendation and be better friends one with another than you have been in the past." Then there is the Advisory Committee of Aeronautics, which has not been mentioned this afternoon, and which, as I gather, is responsible to no one except the Prime Minister direct. Why it should report to the Prime Minister I do not know. That at least might be at once put under the supervision and control of the Air Board.

In effect, the new Chairman of the Air Board is only an intermediary between the two Air Services and the Ministry of Munitions. He does not even control his own factory. The Royal Aircraft Factory is not under him. He cannot, as I understand it, appoint or dismiss a single man in that factory. That is under the Ministry of Munitions. I suggest that the proper course is to transfer to the Air Board the civil powers of the Secretary of State for War over the Flying Corps and the civil powers of the First Lord of the Admiralty over the R.N.A.S. I do not suggest that Lord Cowdray and his Board should interfere with the tactics of Sir Douglas Haig at the front. Lord Derby does not do so. Theoretically he may have the power, as Secretary of State for War, but, of course, he does not do so, nor would the Prime Minister. Therefore, I suggest that their civilian powers ought to be amalgamated in the head of the Air Board, so that even during the war the lines may be laid down on which a great Imperial Air Service may be built up.

I want to ask a further question of my hon. and gallant friend. Supposing Lord Cowdray and his own immediate advisers come to the conclusion that it is desirable and feasible to do what so many others have asked should be done ever since the war began and have a large air offensive, either at Essen or in the Rhine country, consisting of at least a thousand machines?

An Hon. Member: That is not a matter for the Air Board.

Mr. Joynson-Hicks: That is the position. It is not a matter for the Air Board. Supposing they have an idea that it is possible, on the one hand you have the generals at the front managing their own strategy and their own tactics, and you have the admirals of the fleet managing the fleet and requiring aeroplanes or seaplanes for their fleet purposes. I am suggesting quite seriously that there is an opening for a third man or a third body such as this Air Board to formulate, while supplying the army with all it wants in the way of reconnaissance machines, bomb-dropping machines, photographic machines, a net Imperial Air Service, under a new head if necessary, which would take in hand an offensive which, I suggest, might have a very real effect on the conclusion of the war, which would get behind the German lines in a way that artillery cannot get, in a way that cavalry and infantry cannot get, and destroy, in the German country, the moral which is at present upholding the German forces. That is what I want to do, and I ask my hon. and gallant friend can that be done? It is no good telling me it could not be done. It is no good telling me, "You cannot manufacture the machines." Eighteen months ago we thought it could not be done with regard to artillery and munitions.

I do not know whether the House realises that when the war began, in August, 1914, there had never been a single aeroplane engine manufactured in this country at all. They had all been brought over from France. Someone will hang on a lamp post in Whitehall when the war is over for the abominable neglect of the Air Service and the engine question at that time. When I come to the machines, I must say that there are certain machines at the front to-day which are obsolete so far as bombing raids and offensives over the German lines are concerned, which are putting upon our airmen too great a strain, a greater strain than we have a right to ask. My hon. and gallant friend was, I think, not quite right in the suggestion which he made just now, when he asked, Is the work being done? Of course the work is being done. The position is that we are responsible for asking ourselves the question, Is the work being done even in wartime at too great a sacrifice? We are responsible.

I told the Committee just now how many of the best machines there were. I am not going to say how many of the A type of machines there are. It is a machine which is perfectly well known to the Germans as well as to us, which can fly at the outside only seventy or seventy-five miles an hour in favourable circumstances, and at the outside can climb only 8,000 to 10,000 ft., and it takes from forty to forty-five minutes to go up 1,000 ft., and it has to go into battle with German machines, and it has to go on bombing operations over German lines, where it has to meet German squadrons of Halberstadts and Albatrosses with an engine-power double that of our machines and a climbing power of 1,000 ft. per minute, so that it can get up 18,000 ft. in less than 20 minutes, while it can fly at a speed of 110 miles an hour. Should I mention these figures? I hardly know. I am told that if I mention them in this House I shall cause our young men who are flying this machine to be afraid.

Colonel Faber: Not they.

Mr. Joynson-Hicks: But I am bound to say that not once or twice, but over and over again I have had letters from men at the front with regard to these machines. Here is a letter from a flight commander, a relation of a member of this House, who has sent the letter to me. It was written a few days ago, and it shows that the men who have to fly know that this is an inferior machine:—

"I do not know if you have seen the criticism about the R.F.C.?"

and then it mentions that my hon. and gallant friend said that this particular machine was not sent on bomb-dropping expeditions. He quite admits that that was a mistake, but I have had numerous letters from flyers in regard to that unfortunate statement. Then he goes on:—

"This is precisely what they are working it for at the present moment."

This is a man who has done well. He is a flight commander, whose father is a gallant officer in our own army and a member of this House. He goes on:—

"If from any ill-luck I get 'done in' in a bombing raid, I hope that someone will make a fuss about sending flyers out bombing with those machines, which, as everybody knows, are not fit for the work."

He is willing to go and he is going, and he has fought well. Here is letter received this month from another man who has done well. I have seen this man. He is fighting in one of our squadrons. He says:—

"No. So-and-so did a bombing raid, and No. So-and-so did a raid."

and he mentions three machines of this A type, who were sent on another raid. It is too sad. The Committee will believe me when I say that there is a condemnation from top to bottom, by the men who fly these particular machines, of the policy which sends them to fight these high-power German machines on these expeditions.

There has been ample time to clear out the whole of these "A" machines, but, instead of doing that, even to-day they are ordering that type of machine, and they are ordering them not merely for certain purposes at home, but for use at the front. I admit that they are good machines, stable machines, useful

for night flying. But they are not machines that ever ought to be allowed to go over the German lines, and to come into conflict with the enormously high-power German machines, who can pounce on them and shoot them down, even before they know that they are attacked, swooping down from a height of 18,000 ft., while almost invisible from the ground, and smashing up and crashing to the ground our machines almost before the pilots know that they have been attacked.

We have heard during the last fortnight of the great successes of our Air Service at the front. I admit that it has been magnificent. We have not been told the figures of our losses. I obtained them in the same way as the Germans have got them. I obtained them by putting somebody to read through the file of the *Times* newspaper from January 1st to to-day. In the casualties are included the casualties for both Macedonia and Mesopotamia. I think that my hon. and gallant friend will agree with me that the casualties there in flying are very small. At all events, they would not in any degree alter the proportion in these lists from January 1st to to-day. They also include men—non-commissioned officers—who were flying. There, again, the number would be very small indeed—perhaps two or three a month, because nearly all of our flyers are of the officer class. They do not include any accidents. They include only killed, wounded and missing at the front. In January there were 56, in February 119, in March 152, and this month up to date there are 219, more than double the figure for March, nearly three times that for February, and nearly six times that for January. There were this very week 117 reported in the paper on one morning.

I present this dilemma to my hon. friend: Either those men were on the best machines or on inferior types of machines. If they were on the best machines, then I am afraid that the statement of the Under-Secretary that our best machines are better than the Germans is rather discomfiting. If, on the other hand, you think that they were on inferior machines, then a very heavy responsibility is upon the directors of the Air Service, who sent these men over on machines which, on my hon. friend's own showing, he knows are insufficient for the work they have to do, and obsolete so far as conflict with the high-power German machines is concerned. In addition to this, during this same period, the R.N.A.S. has lost 121, and at home there have been 73 pilots killed. That is a rather serious toll to take place at home. A great many of them are on a particular machine—not the one I am talking about now—which has been referred to in this House, which I will call "B," if my hon. friend will allow me. One was killed yesterday in my constituency. Five were killed within the last few weeks in that constituency. Many of them were killed at the aerodrome. After going there all you hear is that this machine is a very dangerous machine to fly. The right course is to stop all contracts. When you find machines getting obsolete, instead of taking delivery by the hundred, you should cut with a knife into the contracts, whatever it may cost the country, and, instead of building obsolete machines, build some of the magnificent machines which we know they are turning out. The new machines are very fine machines indeed. They are sent over with the young men, and men who have been out at the front flying for months are still kept on the old machines, instead of being transferred to the new first-rate machines. In the French Flying Corps, a man goes up from a seventy or eighty miles an hour machine to a 100 or 120-mile machine. With us the men are kept at the old machines, and the new men go out on the new and best machines. That is a small criticism of detail, but I know that my hon. friend will enquire into it.

There are not many of these new flying machines. I will call one of them "X." It is a machine better than any German machine, fitted with our newest and best engines, and can climb and fly faster than the German machines. A squadron of these machines were sent over. There is no harm in telling the House how Lieutenant Robinson, V.C., met his fate, whatever that fate may be. A squadron of these machines were given pilots, most of whom had never been over the German lines at all. They were practising flying up and down behind our lines, and afterwards sent for a short distance for one day. Then six of them were started off for a long patrol over the German lines, and these included Lieutenant Robinson. They were "X" machines, the best we have got. Out of that six one got back to our aerodrome all right, one got back just safely behind our lines, and four either came down or crashed down behind the German lines, and the Germans have got those best machines now. Surely those machines ought not to have started. You ought to have waited until you had got three or four squadrons ready to go over. It is like the old tanks over a gain. The whole secret of the matter is engines, engines, engines. Last week I met six of the principal aeroplane manufacturers in this Kingdom, and they told me they could turn out, and were turning out, as many machines as you like of the best and highest type, but they could not get engines for them. Years ago arrangements ought to have been made to build these high-class engines. Perhaps manufacturers are now being given the encouragement that is so necessary. But are proper plans being laid down for the necessary engines, or are constant tinkering alterations being made to the engines? A member of this House said he was manufacturing a certain part of one of our new and best engines, and that he had been doing it for three months. The week before last an alteration of a $\frac{1}{2}$ in. was made in regard to a certain portion of it; and I asked him what would be the result. I said, "Will it mean a fortnight's delay?" He said, "The result will be three months' delay!" Why was that not thought of before! Why was not that design made sufficiently correct before, in order that the manufacturer, when he had started, would be able to go straight ahead with the work?

I want to congratulate the Government on the reprisals which took place a fortnight ago at Freiburg. But if you are going to have reprisals you must be thorough. You must have an offensive air fleet apart from the everyday requirements of your army. You cannot take your machines from Sir Douglas Haig at the time of a big push. You must have an independent striking force, and I hope the time is coming when such arrangements will be made that every time there is a Zeppelin raid over defenceless towns in this country, every time a hospital ship is torpedoed, every time a merchant ship is torpedoed without notice, every time the German Army commits a breach of the civilised usages of war, there will be a reprisal, swift, sudden, and determined, on German territory behind the German lines.

Lord Hugh Cecil: I confess I was not quite able to follow what is the remedy that my hon. friend desires to apply to the evils which he alleges to exist. He was very anxious, as I was, to increase the authority of the Air Board and to make it an Air Ministry. Practically speaking no board sitting here in London could ever effectively or usefully control operations at the front. The practical truth is that operations must always be left in the hands of the professional soldiers and sailors. My hon. friend is anxious to meet Zeppelins with Zeppelins. I thought that of all the successful things in home defence the resistance of Zeppelins by aeroplane had been most notable. People have been impatient that this form of home defence was slowly developed, but at any rate it has been a really good piece of work through the organisation of aeroplanes and searchlights. I always think that the value of searchlights are inadequately recognised by the public. They are as important in the defence of the country against Zeppelins as aeroplanes. So far as that criticism goes, surely the hon. member is carrying criticism rather too far when he complains of our home defence against Zeppelins.

Mr. Joynson-Hicks: My point is this: Will the noble lord consider the question of the demands of the Fleet in regard to aeroplanes and the great use Zeppelins have been in naval battles?

Lord H. Cecil: That is another point. I understood my hon. friend to be

dealing with the question of home defence against Zeppelins, which has been one of the things that has been very well done. With regard to the hon. member's suggestion as to sending a large number of machines over German territory, that is not a question upon which the opinion of this Committee can be a really valuable one. If ever there was a question which is a technical military question, it is this question as to sending a vast number of military aeroplanes to make an attack upon Germany, and in regard to that technical question the opinion of this Committee is not worth much. The main difficulty is not so much the supply of machines as the supply of pilots for these expeditions. A pilot takes a much longer time to make than a machine. I do not know whether they have got quicker now, but a year or two ago it took from three to five months to train a pilot. If you were unfortunate enough to throw away three or four hundred pilots in this way it would be a serious hindrance to your operations for some time to come. Then we come to the question of obsolete machines. I do not think you can prove anything merely by dealing with casualties. My hon. friend was led so far as to say that if these casualties occurred on the best machines it showed that those were not the best machines. Surely you can conceive that a casualty can happen on the best machine whenever a shot hits the petrol tank or whenever a shot kills or seriously injures the pilot in a battle in the air, and you cannot say because in a number of cases aeroplanes are brought down over the German lines that it shows that that type of aeroplane is not the best. The mere fact of casualties happening shows that you are using the Flying Corps with more enterprise and energy.

It seemed to me that my hon. friend represented that inferior machines should be sent back to the base, and that a battle should take place between two sets of good machines.

Mr. Joynton-Hicks: The whole point of the question is whether the protecting machines are as good as the best machines there are in Germany. We have not sufficient protecting machines.

Lord H. Cecil: I have not the name of the machine referred to.

Mr. Joynton-Hicks: The names are 2 C, 2 D, and 2 E.

Lord H. Cecil: I only wish to point out that the particular machine which has been referred to has various qualities which should be taken into account. It is true that the machine is not so fast as many a more modern machine, and it is true that it has not the quick climbing qualities of other machines, but it is a very easy machine to fly. Let me take an illustration. We are sometimes told that a horse is a "confidential animal," and this aeroplane to which I refer may be described as a "confidential aeroplane." It is easy to fly, and puts less strain on the attention of the pilot. That is a quality of an advantageous character, because the eye of the pilot is not being constantly called to his machine when he has other things to claim his attention. There are machines which fly faster, but they are not so easy to handle. That, I say, is a consideration which must be borne in mind, though, at the same time, I wholly agree with my hon. friend, that it should always be the object to have the best machines we possibly can get for the front. I think my hon. friend is a little too hard in his criticism of the machine. He said it would only go 75 miles an hour, but my recollection is that it goes between 80 and 85 an hour.

Mr. Billing: What height will it climb?

Lord H. Cecil: That I cannot say. I flew the machine on the level, in still air. I admit, as I have said, that we should provide the best machines we can, but we do not want to delay operations, because we cannot get everything perfect. My hon. friend would seem to suggest that we must hold up the operations of the Flying Corps, to some extent, at any rate, until we can chiefly replace all the older machines with newer machines. But we must go on with the war, even at considerable risk; we cannot stop the vital and important work of the R.F.C. until we get what is lacking. I cannot help remembering the speech of my hon. friend a year ago when we had supremacy in the air, for I almost jumped to my feet because he was even more pessimistic then than in his present speech. The machines were even worse then than they are now, and I have often had the idea that when members of the Flying Corps are at all depressed and out of spirits, they should write to the hon. member for Brentford (Mr. Joynton-Hicks). Large numbers of the officers of the R.F.C. are very young men, but I would venture to repeat an observation which has been made, that the root of human progress is to be found in the criticism and ideas of young men under 25 years of age. At that period of life young men are almost always very critical, and it has been said that the ideas, beliefs and criticisms of young men under 25, 10 or 20 years later, become realised; and we may assume, therefore, that the young man's conception of what the ideal aeroplane ought to be will be realised 10 or 20 years hence. I think, however, that criticism of the present machine may be overstated, and if you cross-examine those who make the criticism you often find that very considerable deductions have to be made. I think we are well entitled to congratulate my hon. and gallant friend on the prosperity which has attended the air service in the past year, and on the special measure of success which has attended the operations of the R.F.C. I think that if we could get into the minds of the German General Staff we would find that there is nothing for which they envy us more than our Air Service, and they consider that we have nothing which is better and more efficient. We have, also, the gallantry and glory of our soldiers and, therefore, let us heartily rejoice.

Mr. Billing: The noble lord spoke of the requirements of the machine B 2C, and I think what he said was substantially correct. It is a machine which I, months ago, described here as the "murder" machine. It has a speed, when turned out from the factory, of 72 to 75 miles, with a 90 horse-power engine. In all circumstances it should have a careful pilot who is an engineer, but I suggest that the majority of our pilots are not engineers. With this machine, if the pilot is an engineer, and in sympathy with his engine, he might possibly obtain 75 miles an hour, but when it is sent out before very long it is found that the speed goes down to something like from 62 to 68 miles an hour, and in some cases even lower. With such a machine it is almost impossible to use it to cross the line, carrying an observer. It has a Lewis gun at an angle of 43 near the propeller, and another Lewis gun at the back sticking out at an angle of 43. Under ordinary conditions its speed is about 62 miles an hour, while its maximum altitude is about 6,000 feet. A machine when it crosses the line must be at a height of not less than 6,000 feet. When going on bombing raids the machines cannot carry a passenger, because they have to have the weight of the bombs. They go in batches, or squadrons, and are conveyed by fighting machines, but they have great difficulty in keeping in touch with the convoy, some of which circle away to the right and some to the left. In a case of that kind, with these convoys the Hun has a simple trick for dealing with them, and it is very difficult to stop him doing it. While our machines have been spending fifty minutes to get to an altitude of 6,000 feet, some of the better machines of the enemy get up in from three and a half to four minutes. Those pilots get up about 18,000 feet, and dive on at least one of those bombing squadrons, or perhaps two of them. The result is that the convoys go out in front in order to get those two enemy machines down. What are the bombers going to do with their speed of about 62 miles? They plod along and hope for the best. The convoy engages with the two chance machines, confident that they will be able to catch up with the bombing party. Before those fellows have got on about two or three miles there are two or three more Huns at a height of from 18,000 to 20,000 feet. Directly they see the convoy drawn away by the first two pilots, down they come and shoot those other fellows down.

That is the point I want to make—to try and get them to stop sending over those fellows in that type of machine. It has taken me thirteen months before any member would get up to support me on that point. I used the word

"murder" thirteen months ago. I have had four letters this week, signed by pilots, and fellows who fly these machines call themselves the Suicide Club. I do not want to trouble the House with those letters. I have here a letter coming from a totally different source, which bears out what my hon. friend above the Gangway said. I think I should, without mentioning the squadron, read an extract.

"No. — squadron did a raid on Good Friday. The previous day No. — squadron did a raid."

Then he gives the names of three other squadrons all on B.E. machines, who were under orders for another raid, and continued:

"If the raid is only two or three miles over, you can probably get there and back without being attacked, but they send us to —, nearly 14 miles over, and the Huns catch us on our return. It is not as if one had a chance. Our machines are unable to carry two bombs and an observer, so we go solo. These machines climb very badly, especially when loaded with bombs, say, 6,000 feet in 40 to 50 minutes, and fly 50 to 60 miles an hour. We have two Lewis guns which fire at angles to avoid the propeller and the rudder, and are almost useless on this account and because of the difficulty of sighting in their awkward position. The machines we are flying are the 1915 type. We do not complain about using them with an observer for artillery work, but it is pure murder to send one on long bombing raids and solo. Besides, the effect of the raids is insufficient."

He goes on to make further remarks with reference to forthcoming operations. That was from another pilot in the same squadron as that to which my hon. friend refers. It may be a very sound thing so far as the administration is concerned for a member of the Government to stand up and say that it is not in the interests of the country to criticise and that you must not give information to the enemy. If there had been no criticism in this House I do not know what would have happened. The agitation that took place twelve or thirteen months ago resulted in alterations, and, in fact, it provided the hon. and gallant gentleman with the position he now holds. If it had not been for that agitation there would have been no Air Board, and we should have gone on in exactly the same way.

I do not say that the Air Board is perfect. I have considerable confidence in the ability of the Chairman to do a very great deal, and, anyhow, it is a step in the right direction. I understand that the Director-General of Aeronautics, Sir David Henderson, is being found an appointment in the Scottish Command outside aeronautics. If that is so, I am very pleased to hear it. I have no grievance against Sir David Henderson. I never had. I have no grievance against any particular person, but the difficulty in criticising a service without mentioning the responsible head of the service is just the same as criticising a Department without mentioning the responsible head. It has always seemed to me a rather deplorable thing that criticism in this House to be of any use must naturally and necessarily be what one might call destructive criticism. If any member of the House presumes to offer destructive criticism, always presuming there is someone on the Front Bench listening, it is regarded as something bordering on impertinence to suggest how the Government should do things or how a military Department should do things. The result is that before criticism is tolerated in this House there must be something pretty rotten in the Department that is being criticised. If it were only a slight fall from efficiency I think the critic would have a very bad time. Time is of the essence in this matter, and we have got to get on with the position at the front. There are times when the spur of destructive criticism is the only thing that official apathy will feel. It is necessary, more so now than ever.

I would ask the hon. and gallant member one very distinct question—namely, if the Chairman of the Air Board, assuming that he has the authority, if certain members here can produce evidence to him which cannot be contradicted that these machines are totally unfit for this purpose, will he give orders that these machines are not to be employed any further in France for this purpose, that is, for bomb dropping behind the enemy lines? He might limit their activities to gun spotting and other observations of that kind. Will the hon. and gallant gentleman give an undertaking that the statement he made to me in this House on the 20th of last month shall be kept, and that they shall not be used for this work. If he will not grant that, will he say this, that no further machine of this type shall be sent from England to France to be used for this purpose? If that is too much to ask him, will he see that no further machine of this type shall be ordered now to be built in the future and to be delivered in six months' time in France at the front? From information I have in my possession I am satisfied that that is what is now being done at present. They are ordering these machines. If they are so hopelessly inadequate, outranged and inefficient to-day, how much more likely are they to be so when delivered in six months. The hon. member above the Gangway raised another point, in which I think he was a little misunderstood. That was the question of the men flying better types of machine, of which he gave an instance. It is not always because a man is on the worst type of machine that he is at a great disadvantage, or because he is on the best. It entirely depends on the machine a man has been used to, and not the type of machine. It is a question of judgment. We know at the present moment there are fellows sent out to France who have not had ten hours' flying. They are being drafted out there, they are put into high-speed machines, sent over the enemy's lines for the first time, and they have not a look in. Candidly, they would be better at home here, quite a number of them. I do not want to give the House the number of pilots that went out four days ago, but a vast number of those men had not sufficient experience, and I appeal to the hon. and gallant member to use whatever influence he may have with the authorities to see that those men are thinned out when they get out there, and not sent over the lines until at least they can have some chance to use that bravery which we are all so busy praising in this House. If these men were not so brave and so full out you would hear a great deal more about it, but it is because they are so full out that they put up with these inefficient machines.

The hon. member for Brentford also raised the question of a sustained air offensive, and I would like to suggest to the Air Board that there has existed for a long time an opening for a sustained air offensive quite independent of the requirements of the Naval and Military wings. The Naval Wing was formed, in the first instance, to provide the Grand Fleet with machines for gun spotting and observation and to assist the Grand Fleet in operations on the High Seas, but the Royal Naval Air Service has never fulfilled its functions. It has never yet been able to produce anything that was really of any material use to the Grand Fleet. The result has been that it has been used in many instances to devil for the R.F.C. When the R.F.C. have been weak in any place we have sent them a squadron of R.N.A.S. machines. I think the members of the R.N.A.S. at least do not think very highly of that, although they are quite willing to do it. I can assure the Committee that there are a vast number of machines now in this country, despite our losses at the front, under the administration of the R.N.A.S., both stored here and being taken delivery of. If these machines are in the country and the pilots, surely they can be put on some useful work. It has been suggested that to initiate one reprisal raid and then stop is a bad policy, and I quite agree. What is responsible for the apathy in the administration of the R.N.A.S.? One thing it is doing—it is using up an enormous amount of the output of this country and arresting an enormous amount of facilities which might be used to advantage for the R.F.C.

I had occasion last week to ask the Prime Minister what our attitude towards America on the question of the production of machines was likely to be? We all know that the American mechanical resources for the building of aeroplanes are limitless; if any resources are limitless, they are in the United States.

It is some weeks now since the Americans came into this war, and yet, I understand, we have absolutely refused to give them access to our designs or to our latest types of engines, owing to some commercial cause. I think that is a very great pity. I am confident that the constructors in this country would be willing to meet the American Government and supply them with the very latest types of our machines, and I quite fail to see why we should not supply the American Government with the latest types. What is the use of asking our new Allies to blunder through all the mistakes which we have made for two and a half years? When the hon. and gallant gentleman (Major Baird) replies, I should like to know whether there is any likelihood of the drawings and specifications of one of our latest types of machines being sent to America in the next ten days. I cannot see any excuse for them not having been sent ten days ago, so that the American constructors might have something to work on. It would be quite possible for the American nation, without any great strain on their resources either of personnel or of material, to raise 5,000 or 10,000 bomb-dropping machines in the next six or eight months. I think it is also feasible that they might be able to provide pilots for at least half that number, which would be a very fair average to allow for crashes; and I think, if this war does continue through this year, as it seems likely to continue, it would be a very useful thing for the Allies if the Americans could put from 3,000 to 5,000 bomb-dropping machines on the Western or on the Eastern front early next year. The effect of raids carried out on a vast scale, as they could be carried out, without any trouble to ourselves or any drain on our resources beyond supplying America with the drawings and specifications and possibly one or two machines to help them through the initial stages, would be incalculable. But it wants to be done now.

You want vast numbers of aeroplanes, but the mere ordering of them will not win the war, and what I have endeavoured to suggest here is that what is essential is to start off with a policy. Never since the outbreak of the war has there been anything approaching a fighting policy in either of the Air Services.

If whoever is responsible for initiating an air offensive will make up his mind what offensive we shall initiate, and then consult with those who understand the construction of the machines as to what sort of machines will be necessary to carry out that operation, then we might get a little further.

Assuming that we were contemplating a big raid on Essen in six months' time, and continued raids on other parts of Germany, it is possible to standardise a bomb-dropping machine for the next six months. Not only is it possible, but we have the types now. One gets into consultation with the people who have experience in these matters, and the Chairman of the Air Board says, "I want a machine of such a performance at such-and-such an altitude." It need not be a very quick-flying machine if heavily loaded, because in bomb-dropping raids they always start a good way behind our lines, so as to get height before crossing over into the enemy's country; but it must have at 16,000 feet a speed of not less than about 60 knots, or even 90 miles. If it has got that, and if it is capable of about five or six hours' duration, which would give 500 to 600 miles radius there and back, and if it is capable of carrying perhaps two 200-pound bombs, that will do. We have that machine in existence to-day.

It is quite an extraordinary thing, as we had it in existence twelve months ago. To a certain extent it has been standardised, because we are still building the machine. But we have been at it for twelve months, playing at it. We have never taken it seriously. If the authorities standardised that kind of machine for six months, and put 1,000 in hand, and then put in hand the training of the men necessary to fly these machines, in six months, or in three months' time, as was necessary, it would be well. Then it comes to a question of providing fighting scouts to accompany them. That is a thing you cannot standardise. It is utterly impossible to do it. I would suggest that orders for that type of machine should not be given at a maximum of more than one month's output to any firm who took it on. Those machines want restandardising practically every month. Provided that a firm is given an order, at twelve or fifteen machines a week for sixty of them, which will represent a month's output, then at the end of that time you could standardise that type again with the improvements that the month's air flying had taught, and that machinery could go steadily on. You could standardise your fighters every month, and your bomb-droppers every six months. There is nothing to stop you doing it now. We could arrange the delivery and the commissioning of the pilots to synchronise with a definite policy in hand, and these raids could be commenced. All this could be done without interfering in any way with the output in this country for naval and military requirements, providing that which is asked for the naval and military pilots is limited to what the Army and Navy is justified in asking for.

It has been suggested that the Admiral of the Fleet or the Field Marshal in France should be responsible for arranging these raids. That is a false policy. All we want is the matter of the enemy's country in conference with the Secret Service people. It is quite possible in conference with a Secret Service officer and a map to plan any number of raids where they shall be initiated and where they shall take place. I say that this could be done without interference so far as either naval or military requirements are concerned. Not only that, but if the material which the Royal Naval Air Service at present are not employing was taken over it would form a very considerable nucleus for such Imperial Air Fleet or raiding squadron.

I should like to congratulate the Government on the recent changes and promotions in the R.F.C. I consider the new system of a Director-General, one of the happiest appointments that has been made for a long time. The promotion, too, of several other officers is likely to have not only far-reaching, but immediate results in many of the cases which hon. members have felt it their duty to bring before the House. In regard to that very interesting suggestion made by my hon. and gallant friend as regards what is likely to happen when peace comes, and as to the Committee he proposes to set up, I think the Government are fortunate in their selection of a chairman.

It seems to suggest that at last the administration of the R.F.C., the R.N.A.S., and the service generally is passing out of the hands of what might be called the elderly politician. It has always seemed to me such a pity that the administration of a service such as this should not have been placed unreservedly in the hands of the generation that brought it into being. It is a new service. It demands new interest. Young men should have their opportunities. I do not think that history records any case where it has taken longer for the younger men to come into their own, both in the administrative departments and in other departments than in this war. We have trusted very much to elderly advice, for in this country we always pay respect to grey hairs. Hence it has been rather difficult to convince some of them that possibly their views and their opinions were not quite in keeping with the ordinary lessons of the war in front of which we find ourselves.

"The lamp of your youth will be utterly out,
But they shall subsist on the smell of it,
And whatever they do they will fold their hands,
And suck their gums and think well of it;
Yes, they shall be perfectly pleased with their work,
And that is the perfectest hell of it."

Captain Burgoyne: The newest of our services has for too long been the Cinderella of our Government Departments, and those of us who have taken an interest in the matter have not only rather begun to despair, but at the same time they have been a little suspicious as to what was going on behind the scenes. To-day the Parliamentary Secretary has very kindly lifted one corner of the curtain, and we are enabled to see that the progress that is being made under

the auspices of the new Board is not all that we would wish, at all events something is being done.

I want to deal with the Royal Aircraft Factory. That factory has got a very bad name in this House, and I do not think it has altogether been deserved. I regard the Royal Aircraft Factory as the cradle of the R.F.C. From the efforts made there in the initial days have sprung very nearly all the successes which have been obtained up to the present time. Not only that, but it deserves a position of greater importance, because it is the only Government air dockyard in existence; and, even if it does not develop to a much greater size, it will be the first of a large number of similar institutions mainly on the lines of the dockyards provided for the Navy at the present time. I hope the Committee will bear with me while I deal with the Royal Aircraft Factory during two different periods.

I want to take, first of all, a period from the time when the first design of the first stable machine was framed up to the outbreak of war; and, secondly, a period from the outbreak of war up to the present time. I am doing this for this specific reason—to show that there is some contradiction of policy in regard to an institution which ought to be one of the great standbys of the air service. My hon. and gallant friend will recollect that about 1910 the officials of the Royal Aircraft Factory, under a most able superintendent, decided, after a most careful investigation, that a tractor biplane was the most suitable for military work; and in 1911 the plans were published of the machine which subsequently got known as the BE 1, which, I believe, means the Bleriot Experimental. The engine was not found to be satisfactory. It was an old engine taken out of a smashed Bleriot, and it was replaced with the 60 h.p. engine, and this became the BE 2. At that time the Royal Aircraft Factory was doing precisely that for which it was intended; that is, experimental work of the very highest kind. Minor alterations were made in the general design of that now aged biplane, and with those alterations came the BE 2A. In this machine the pilot considered that he was not quite as comfortable as he ought to be, and the body was made narrower in order to give greater protection. In 1912 the Secretary of State offered a prize to all comers for the best machines, and the trials took place in August, 1912. The date is significant, for it is two years before the war broke out. The trials took place, and out of 31 machines tested, the latest Cody machine came out on top. When they had secured in this way the best machine, they tested it with their BE 2 against it, and it beat the Cody machine on every single ground, and at once a colossal order for 12 of these machines was given.

I will now leave machines and see what the Royal Aircraft Factory in its halcyon days was doing in the matter of engines. Engines then, as now, were the controlling factor in aircraft, and they were astonishingly bad. Early in 1912 the Royal Aircraft Factory asked for a grant to design and build an engine, but the War Office turned it down, as they frequently turned down things which were new and which the old men there did not understand. Nevertheless, the Secretary of State took it upon himself to order on 14th October, 1912, an engine to the design of the Royal Aircraft Factory, and on 13th December of that year a grant was forthcoming, and the outcome of that was the 90 h.p. R.A.F. In 1913 both the Admiralty and the War Office decided that they wanted something good in the way of engines, and so a large prize of £5,000 was offered for the best engine, but the one that gained a prize was found to be impracticable in actual service, and again the 90 h.p. R.A.F. came out on top and it was installed in the old BE 2B.

I will carry this history a little bit further. All this time the Royal Aircraft Factory was doing precisely the work for which it had been established. In the following summer, Mr. E. E. Busk, the head of the research side of the Royal Aircraft Factory, told the superintendent that he thought he had a design for a stable machine which would also be easy of control, and in the Estimates for 1914 £5,000 was put down for an aeroplane to be flown without the use of a control. I am glad to have an opportunity of bringing these facts before the Committee, so that the absurdity of the administration of the War Office with regard to the Experimental Department of the air service may go down on record. The superintendent of the Royal Aircraft Factory fetched out the old BE 2B, pulled it to pieces, repainted it, and redesigned it, and it emerged as B.E. 2C. We have been talking about the B.E. 2C to-day. That was the first inherently stable machine. It was completed two months before the outbreak of the war, and when the war came upon us the only effective machines we had to send to France were 60 at the maximum to fight some 1,300 of the Germans. If there had been official authority to carry on experiments with the speed with which they should have been carried on, we had every opportunity of preparing a really first-class design of stable machine, whereas we had to take the old B.E. 1, re-designed several times, worn out with constant service, and from it drew up plans which were of very little value, but from which we discovered the stable machine in use at the present time.

Up to the outbreak of war the Royal Aircraft Factory was absolutely fulfilling its job. It was experimenting, and experimenting hard, and it had discovered something that every single nation now engaged in the war would have been glad to have had, and against its work there was official crabbing right from the beginning. I go so far as to say that even with regard to a height record which was got out by a young pilot called Spratt, the head of the air service himself, Sir David Henderson, said, "You had better give us these record stunts." I put it to the Committee that the job of the Royal Aircraft Factory was to carry out experiments. What happened after war broke out? Here I hope that I shall have the attention of the Parliamentary Secretary, because I am going to deal with the Royal Aircraft Factory upon rather different lines. Subsequent to the outbreak of the war we had, naturally, very largely to extend the staff and the means of production of that factory. Owing to the fact that it was extremely difficult to get hold of men accustomed to aeroplane work, there was a considerable falling off in the efficiency of that work. Furthermore, owing to the fact that we had no proper engines for aeroplane purposes in this country they looked to this 90 h.p. R.A.F. to provide the initial design of every other engine. We heard all sorts of rumours, committees were appointed, inquiries took place, and in the result the Royal Aircraft Factory got a name which was certainly not very sweet. What did we get as the result of all these inquiries? We got a series of statements defining the exact position that the Royal Aircraft Factory ought to hold in the future. It was found, as we all know, for purely experimental purposes, and the scientific data from which machines were to be designed were obtained, I understand, from the National Physical Laboratory. At all events, that laboratory worked with the Royal Aircraft Factory. We now come to the first point, as to whether or not the Royal Aircraft Factory at the present time is fulfilling the work set out for it in the statements made by the hon. and gallant gentleman in this House and by his associates on the recent Air Board, with which he was also connected, and other eminent people. The committee on the administration of the R.F.C., in their report of last year said:

"We think that the continued existence of the Royal Aircraft Factory is essential."

Everybody agrees with that. It is our first aerial dockyard.

"It should not, in our opinion, become a manufacturing establishment, but should confine itself to the five subjects stated in the Report, namely: (1) Try and experiment; (2) research; (3) preparation of drawings; (4) repairs; (5) manufacture of spares."

It is perfectly well known that the factory is much more a manufacturing factory than it is devoted to research work. I propose to read letters and other documents to prove that it is so. My argument becomes a little difficult in that I have found the Parliamentary Secretary to the Air Board out in a complete contradiction of statements in his opening remarks. He first said of the Royal Aircraft Factory, "It is being dealt with on precisely the same terms as any other

manufacturing firm." He subsequently told us that they were doing exactly as much research work as before. He cannot run with the hare and hunt with the hounds. Neither of these statements can be absolutely right. Then we get the official organ of the Royal Aero Club:

"Let the Royal Aircraft Factory stick to its original charter—the prosecution of practical experiments, and, as we have had occasion to point out consistently in past years, it will have all its work cut out to keep this country to the front in the science of the air."

Lord Curzon in another place on 1st August last year, said:

"The Government take the view that the main work of the Royal Aircraft Factory—"

I emphasise the word "main."

"must continue to be experimental rather than manufacturing."

Then we come further still to the Air Committee's report:

No reduction should be made in the amount of experimental work conducted at this factory."

Finally, I take the remarks of the hon. and gallant member himself in the House of Commons on the same day, when he said:

"The Royal Aircraft Factory is primarily and mainly an experimental establishment—"

He added:

"It is therefore not thought advisable to place the factory under the Ministry of Munitions."

What has actually happened? In the first place, the Royal Aircraft Factory has been placed under the Ministry of Munitions.

Major Baird: What date is that?

Captain Burgoyne: 1st August last year. I should like to say that I am not greatly concerned whether the Royal Aircraft Factory manufactures or not, but let us get a perfectly clear policy on the subject. The hon. and gallant member contends that it is doing as much experimental work as in the past. If that is so, it is perfectly obvious you must have a highly technical experimental staff. You cannot carry on as much experimental work of the same useful kind if that staff be constantly changing. The matter was so important that in the report of the Air Board of 27th July last this appeared:

"The object to be aimed at in the view of the Air Board is an increase in the output of aeroplanes by an improved organisation of the existing staff."

I am a very humble business man, but I know perfectly well that you cannot expect to get the best possible work out of a business if you keep changing your staff. What has been the attitude of the Air Board in regard to the Royal Aircraft Factory? They start by moving—I dare say for very good cause—Colonel O'Gorman from that particular sphere to another sphere where, no doubt, he is doing valuable service, and we get Mr. Fowler put in charge. I have never had the privilege of meeting him, but I am quite sure that Mr. Fowler is a man of very eminent capabilities, but obviously, however eminent and whatever his business capacity, he has got to spend some time getting a grip of that huge business employing nearly 5,000 people. How much further did they go in getting rid of their expert staff? Lieut.-Col. Hextall Smith has gone; Major Green has gone after eleven years' service; Capt. Hiscox has left after nine years' service; Capt. Winnington has been removed from the Electrical Research Department, after two years' service; and Mr. Heron has left after valuable service on experimental work. These are all very necessary men. Capt. Grinstead, chief officer of Physical Research, after four years' experience, changes his function to that of chief designer. It may be passing through the minds of one or two hon. members, "Ah, but they were not found fit for their jobs." Every single one of these gentlemen has gone to a very high billet in a private firm. There has been competition to get these men, they are so good. If the hon. and gallant gentleman is going to tell me, "Ah, but what we have done is to send our people out as scouts in advance so that we get a hold on these private businesses," then we can talk matters over on a different basis; but if he is not going to say that—and obviously no one is going to make such a suggestion, when it would get back to the whole trade—why in the world did he allow the very best men to leave the Royal Aircraft Factory, the only air dockyard that we have got to-day?

What is the programme of the Royal Aircraft Factory for the coming year? We have had strict injunctions not to say anything likely to help the enemy. I do not think in the few speeches that I have made on technical subjects—and they almost always concern something technical—I have been found out in that fault, and I shall endeavour to avoid it now. But even the Air Board have felt a little unhappy as to what they were doing in the matter of policy with regard to the Royal Aircraft Factory. Annually a programme has got to be prepared for the purposes of the annual estimates, and on this occasion the programme for the Royal Aircraft Factory ran into many scores of aeroplanes. I want to emphasise their discomfort by mentioning the fact that as adjudicators in all these matters they wrote to the General Officer responsible for these orders over the signature, "H. P. Harvey," who, I believe, is Secretary to the Air Board, as follows:—

"The proposed course has the disadvantage of involving a rather large order to the Royal Aircraft Factory, which is contradictory to the assurances which have been given in Parliament."

I shall be glad to show the hon. and gallant gentleman the letter. It was sent to the General Officer from whom you get the programme of the factory for the next year, and it was written on September 28th last year. This General Officer, in whom the entire service as also the Air Board has the utmost confidence, sent an absolutely admirable answer that he was trying to do the very best for the Air Service. This placed my hon. and gallant friend on the horns of a dilemma, and he has been bound to reverse the policy laid down in this House and by various Committees which have sat upon the Royal Aircraft Factory. The concurrence of the Air Board in the reversal of their policy down there had not been obtained—anyway, up to the end of January this year.

These are naturally private documents, although they are not confidential. I am only going to read one small section of the answer to that letter from the Secretary to the Air Board, because it seems to me to state in very precise language why we should have the Royal Aircraft Factory. It refers to the development of new designs by the construction of the units of so many aeroplane engines a year, and the provision for emergency orders to cover shortcomings by contractors. I now come to a very serious criticism indeed. I do not object in the slightest to the Royal Aircraft Factory building aeroplanes. It is essential that they should do their best to keep our designs right up to the mark, but what is wrong is that they should start the construction of designs which have been sworn to be better than anything turned out by private firms and subsequently, after great expenditure of public money, find that the series has been deleted. I would ask the attention of the Parliamentary Secretary to this: I am certainly not going to give any names or the numbers of machines, but the types which are to be tested in next year's programme are six, of which it is said:—

"As the provision of all machines is very much ahead of machines in use now passed, probably these types will, if they are well handled, be unserviceable for the whole of next year."

Of one of them it was stated—this is interesting:—

"The design should be completed by January 30th, 1917, and the first machine flying by March 14th. It is considered that this aeroplane might be safely manufactured at the Royal Aircraft Factory to the number of thirty before the first machines are flown."

Mr. Montagu: Will the hon. and gallant gentleman be good enough to tell

us exactly what it is he is reading from? Is it the published Report of the Air Board?

Capt. Burgoyne: No.

Mr. Montagu: Is it correspondence between the Air Board and a private firm, or between the Air Board and the Royal Aircraft Factory?

Capt. Burgoyne: I agree that that is a perfectly proper question. These are letters that have been sent to me. They are not letters which are going to involve anyone, or give information to the enemy. If the hon. and gallant gentleman thinks they are going to give information to the enemy, of course I will close down at once.

Major Baird: I am quite sure the hon. and gallant gentleman would never read anything which would give any information to the enemy, but I must say that I am very much surprised at hearing letters read out which, to the best of my belief, are official letters addressed by the Secretary of the Air Board to another public body. I do not know and do not wish to inquire how the hon. and gallant gentleman obtained them, but they are undoubtedly official documents. I would also point out they are all from the old Air Board. The conditions are now absolutely different. The old Air Board, of which the present Air Board is not in direct lineal descent—it is quite a new organisation—expressed certain opinions, not in public, with regard to these matters. The constitution of the present Air Board is based on the decision of the Cabinet. Under the constitution of the present Air Board, the Royal Aircraft Factory, comes under the Ministry of Munitions, but for the purpose of experiments it works in the closest possible touch with the technical department of the Air Board. I would point out that nothing is to be gained by adverting to a communication between a body which has ceased to exist, in the shape of the old Air Board, and the Royal Aircraft Factory, which in those days was under the direction of the Director of Aeronautical Equipment.

Capt. Burgoyne: I quite agree with what has been said by my hon. and gallant friend (Major Baird) and the right hon. gentleman (Mr. Montagu), who is quite right in what he says. I would like the Committee to believe that I do not want to do damage in any direction, so I will go straight off that. It would be interesting to know whether the National Physical Laboratory at Teddington is in the hon. and gallant gentleman's department.

The National Physical Laboratory was founded to investigate scientific problems and to help all those interested in aeronautics. Obviously, if it was founded for that purpose, manufacturers and men whose integrity is above reproach have the right to go and obtain the result of those investigations. At the present time how do they stand? They have, first, to get a permit as to whether or not they can have that knowledge. When they go down with that one specific question, they get an answer back; but if there is another question which seems to arise out of that answer, they cannot put it because they are told they must get another permit. In one instance it took three months to obtain the information required, and in that time the particular series of machines dealt with in the question was deleted. It would be advantageous to the whole of aeronautics if any man well known to the authorities and who was above reproach and desired information, could go down there, hand in his card, and say that he wanted to know this or that. That is what the National Physical Laboratory was founded for.

Mr. Butcher, speaking as a member of the Air Committee over which Mr. Justice Bailhache presided, and which reported in November last after paying a strong tribute of praise to our pilots' splendid work, referred to one instance of their gallantry. He said: Only this afternoon I was speaking to one of our wounded airmen. A year ago he was flying in France over his head was hit by the enemy, and fell on the top of his machine. The two machines were locked together, and they, with the two pilots and observers, fell a distance of 1 mile from the sky to the ground. It sounds a little more like fiction than fact when I tell the Committee that one of the pilots who fell that mile from the sky is still alive. I regret to say he is grievously injured, but he is still alive, with a splendid cheerfulness and courage which distinguishes all our wounded. He was here this afternoon listening to this debate. I trust that some form of employment will be obtained for him, which he is still able to do, notwithstanding his injuries. That is an illustration worth giving as showing the kind of things our airmen have done and will do in this war.

May I say a word about the recommendations of the Committee of which Mr. Justice Bailhache is the Chairman? Our first recommendation was that the equipment of the R.F.C. should be entirely separated from the executive command. That has been done, and I believe everyone approves that it is a proper and useful change. Our second recommendation was that there should be one equipment department, charged with the equipment both of the Army and Naval Air Services. I am glad to say that the Air Board is the embodiment of that recommendation. As to the second recommendation on which my hon. and gallant friend (Capt. Burgoyne) has enlarged, namely, that the Royal Aircraft Factory should not become a manufacturing establishment but should confine its activities to the subjects with which they dealt formerly, I had to be assured by my hon. and gallant friend that the Royal Aircraft Factory is not going to become a great manufacturing department. The subjects with which it dealt in former days, and up to comparatively recently, were mainly trials, experiments, research, and the preparation of drawings, and I gather from something my hon. and gallant friend said in his speech that so far as trials, experiments, and research are concerned, the functions of the Royal Aircraft Factory would be continued in the future substantially as in the past.

Major Baird: Yes.

Mr. Butcher: I am very glad to know that, and I would suggest that if they are going to carry out these functions satisfactorily, it might be a certain interference with their success in that capacity if they were to become a large manufacturing concern. I think it would be far better if they assisted the Air Board and the technical advisers of the Air Board in experiments in designs, as to designs of aeroplanes and engines, and let the private firms of the country to a greater extent do the manufacturing. I hope my hon. and gallant friend will be able to give us some assurance on that point. As I say, the Air Committee of which Mr. Justice Bailhache was chairman strongly recommended that they should not become a great manufacturing establishment, and that recommendation was made after hearing very carefully all the evidence. Then there was one other recommendation which has not been touched upon to-day, and I should be glad to know what is going to be done with regard to it. That recommendation was that observers should receive promotion without having to become pilots. As matters stood when our report was made, no observer could ever get promotion at all, unless he qualified as a pilot, and then got promotion as a pilot. We had a great deal of evidence which, at any rate, satisfied us that there are some men who are admirably useful as observers, but who possibly might not be so successful as pilots, and that it really is not fair to them to insist they should go into another occupation, in which they are not nearly so good, maybe, as that in which they are engaged, as a condition of getting promotion. This is, perhaps, a matter which hardly falls so much within the department of the Air Board. I do not know how that may be. I should imagine it is not; but perhaps my hon. and gallant friend will kindly take note of it in passing and bring it before the proper authority.

The hon. member for Brentford (Mr. Joynton-Hicks) referred to the question of the mastery of the air. I venture to think that the expression "Mastery of the air" is a somewhat misleading expression, although I believe my hon. friend was the first and true inventor of it. Probably he means the same thing as other people mean when they speak of superiority in the air; because there cannot be any mastery of the air. There cannot be any absolute and

complete mastery of the air, as we speak of mastery of the seas. I venture to think that it is quite impossible that we could ever drive out of the air every German machine and ensure that no machine should ever go up on the battle-fields of France and elsewhere except our own. What we can aim at, and what I think we have successfully aimed at, is superiority in the air, and I think we have never lost the superiority. At some times our superiority has been greater than at others. There is no doubt that in some respects some of the German scouts and fighting machines have very greatly improved of late. I believe the true position at the present time at the front in France is something of this sort—and in this I am quoting what has been reported to me by men who have recently come back, and who know all that can be known about fighting in the air in France. What happens is this: We are on the offensive, and therefore it is necessary for us to fly over the German lines constantly, to fly far over them, and to take observation for purposes of gun-spotting, for bombing, and for all other operations essential to an offensive. The Germans, on the other hand, at the present time are, and for some time have been, strictly on the defensive, and their policy is, when our machines go over their lines, to send up some fast fighting machines and attack some of our slower machines; and that they have done with certain considerable success. I believe that at the present time the Germans have a very fast fighting machine with very powerful engines, and with very considerable power of climb and of speed. I should like to be assured that sufficient care is being taken to see that we have the most powerful and effective engines possible. The German engine is, I understand, the Mercedes. I am rather inclined to believe that we have not any engines of the Mercedes type. I do not quite know why, because I presume the design of the Mercedes is just as familiar to us as it is to the Germans. I know we have some very good engines of high power, and if we want to obtain that undisputed superiority which is essential to us we must do the very utmost we can to get the highest powered engines. I have heard the phrase, "Building an aeroplane round an engine." I believe it is not an inapt phrase. The engine is of far more importance than the aeroplane, and if you have a first-rate engine, thoroughly reliable, of very high power, I should think it quite possible that it is the view of experts that you can build an aeroplane round it which will do justice to the engine.

There was one point connected with the recommendations of this Committee to which I want to refer. One of the members, Mr. Charles Bright, took immense pains not only to think out and digest the evidence given, but I think he also read every part of the literature of engines and aeroplanes which exists in this country. He made some very valuable separate recommendations, and I was very glad to hear from my hon. and gallant friend, in a reply to a question the other day, that some of these recommendations had already been adopted and put into operation. I think he also said that it was probable that some other of these recommendations would be adopted, and I shall be glad to hear from him, when he replies, whether further progress has been made in that direction. The only other thing I have to say is this: I should like to quote three lines from the end of the report of our Committee, in which, speaking of the services of Sir David Henderson and those associated with him in the R.F.C., we said this:—

"The gratitude and thanks which are Sir David Henderson's, due for a great work devotedly undertaken and well done, he will, we know, be glad to share with the officers and men who have served under him, whether as commander of the R.F.C. or as Director-General of Military Aeronautics."

I can only hope that after the Air Board has been in existence for some time it will be possible for us truthfully to give the same high measure of praise which we felt bound to give as his due to Sir David Henderson and the officers and men of the R.F.C. associated with him.

Major Baird: Allow me to say how much I appreciate the way in which the Committee has accepted the Vote that has been presented, but if they are good enough to be more or less satisfied with the prospect presented to them of our programme in the matter of aeronautic development it is only fair to say that the credit belongs not to the present Air Board, which has only just taken it over, but to its predecessors of the Army and Navy, who have carried on this very arduous duty since the start of the war. It is necessary to say that because it would be quite unfair for us to take any credit for the existing state of affairs. The criticisms which have been offered may be summarised fairly easily. In the first place, there is the usual criticism of the B.E. machines. That is, so far as anything can be in aeronautics, a hardy annual, and I am sorry not to be able to give any satisfaction, I am afraid, to hon. members who quite definitely ask that that machine should be withdrawn from the front. It is impossible to withdraw it until it can be replaced by another. Otherwise you are going to handicap not only your air service, but the artillery, the infantry, and the General Staff, and to upset the balance between all the services. To withdraw these machines from the front is absolutely and entirely impossible. I want the Committee to remember that the casualty returns, measured by the percentage of casualties suffered by the different categories of machines, do not bear out the contention that this is the machine which has the largest percentage of casualties. That is a very important point. The Committee will not expect me to give the figures. Not only is the percentage of casualties, having regard to the number of machines in use, lower than the percentage of casualties with the higher-powered, more recent, and up-to-date machines, but it is very much lower, in some cases almost a half, of what it is with these higher-powered machines. The reason is that the kind of work that hon. members complain about as being the sort of work these machines ought not to do, and which I admit they would do if we had better machines, is the sort of work they are only employed upon in exceptional cases. The work they are normally employed upon would be work which they could not possibly do unless the sky were kept clear of fast German fighting machines. It is the kind of work which cannot be combined with fighting, and therefore, however efficient they might be from the fighting point of view, they would not be able to do the work which they are sent up to do and fight at the same time, and, consequently, it is only in exceptional circumstances, when they are sent on these long bombing expeditions, that hon. members complain. I have no right and no power, and I would not desire if I had the right or the power, to urge the withdrawal of these machines from the front on the ground of undue risk. Supposing in a land battle, when you got to the end of your ordinary troops, and had nothing left but batmen and cooks, what justification would you have if you lost the battle, which you very likely would not have done if you had put those batmen and cooks into the line? It is ruthless and brutal—anything you like—but it is war. We are supplying proper machines as rapidly as we can, but until we can supply them there is not the slightest chance that we can discontinue to send the other machines up on these duties.

Mr. Joynson-Hicks: I do not wish to press my hon. and gallant friend, but can he give any approximate date when he thinks there will be enough new machines to prevent these machines going on bombing expeditions?

Major Baird: Aeronautics is a most desperate thing to prophesy about. Let me give my hon. friend an example of the kind of difficulty that absolutely queers the pitch. One of the new machines which we are sending out has a very satisfactory engine, but an appalling quantity of them have proved to be faulty when we came to test them in all their parts. It was due to faulty casting, faulty mixture, and faulty treatment. I only mention this as showing the extraordinary difficulty of prophesying. That puts the manufacture of these engines back. The difficulty had to be got over. It put back the output of these machines and postponed the time at which they could come into use. That is an instance of the difficulty of prophesying when these machine will be available.

Mr. Billing: Was the design faulty before they made the new castings, or was it purely and simply in the mixing of the metal that the mistake occurred?

Major Baird: It was not the design at all. Then I come to the R.E. 8. I was taken up in the R.E. 8 last summer, when it came out and went to the front. It was reported on very favourably, and the machine began to come out in quantities. Hon. members perhaps know the history of that machine. It is produced in deference to requirements which are received from the front. There are no drawings, and it is made more or less by hand. When the R.E. 8 went out it met with universal approval. Having been made in deference to the requirements received from the front, it met those requirements, and it meets them to-day, but, unfortunately, you cannot get pilots to agree about it. Men who are flying the B.E. at the front are clamouring for this machine. Officers who are flying from headquarters to the brigade at the front all beg to be given this machine in preference to other machines, and yet you have most regrettable and horrible accidents happening with young pilots. I am sure the hon. member for Herts has been misinformed when he said that young pilots were sent up after such a short time in the air. The minimum number of hours is 26.

Mr. Billing: Does that 26 hours include the initial training to obtain a pilot's certificate, or the 26 hours' cross-country flying, or the 26 hours' training in the air?

Major Baird: Twenty-six hours' soaring in the air. That is not all. Do not let hon. members imagine that when a pilot gets out to France he is sent over the lines until he is considered by the officers out there to be fit. Of course, an occasion may arise when a man arrives from England in the afternoon and he is sent up bombing at night. That is not outside the bounds of possibilities, but as a general rule a different system obtains. No one realises the value of the pilot's life more than those who depend for the success of their operations on the work of the pilot, and no one is less likely to squander the pilots—it is a horrible expression to use, but I hope hon. members know what I mean—and no one is less likely to make a pilot unfitted for work where the risk is disproportionate to the result which may be expected than the officer in command of the pilots at the front. Therefore I am sure that my hon. friend has been misinformed. The information I had to-day as to the number of hours is quite definite. I was told that the minimum was 26, and that was confirmed quite independently when I happened to be with a squadron the other day. The R.E. 8 machine has given satisfaction. Of course, there had to be modifications. I do not say it is perfect. It would be ridiculous to deny that a machine on which there have been numerous accidents requires modification. Of course, it is not entirely satisfactory. It does good work in the hands of the men who use it in France, but apparently it does require modification in order to make it suitable for the average man. These modifications are being dealt with, and we hope that the result will be thoroughly satisfactory. As regards standardisation, do not let there be any idea that there is a hard and fast cast-iron objection to standardisation. You can afford to standardise your first hundred or two hundred machines according to the output of the factory with which you are dealing, but if you are going to have an output it is wise to do it, because nothing hampers production more than constant alterations. But unless you reserve to yourself the right to introduce modifications into the second batch of two hundred or three hundred machines, or whatever may be the number ordered, you are going to find perhaps at the end of six months that you have out-of-date machines. Within these limits standardisation is being carried out, but not on so large a scale as the hon. member for Herts wishes.

Mr. Billing: I suggested only the standardisation of certain types.

Major Baird: We must have absolute freedom of action. The hon. member was good enough to supplement what he thinks is the gap in our powers or activities. He says there is no policy, and he wants to offer us one, cut and dried, with machines, pilots and the whole thing complete. Let me assure the hon. member that a policy does exist, and that it is perfectly impossible to draw up a programme unless you have a policy. The idea of living from hand to mouth in regard to machines or engines would land us into chaos, and probably into a position where we might have no machines in a very short time.

Mr. Billing: Does that include building policy or fighting policy? Do you control operations?

Major Baird: No. Nothing would be more deplorable than to spread the idea or to cultivate the idea that air fighting is an amateur's business. On the contrary, the men who have acquired experience in the war as airmen, and who are now at the top of our Flying Services, both in the R.N.A.S. and in the R.F.C., are the people who are far more capable of deciding how our aerial resources can best be employed, and they do that on the strength of their experience and knowledge, not only as airmen but also as men whose business in life it has been to study war. I deprecate very much the idea that it would be to our advantage in any way that an attempt should be made to take the conduct of operations out of the hands of trained naval and military officers. That is not the case. The point is that there is a very much wider question than the mere operation. We decide the policy, but the operation has been decided upon by the naval and military officers who are going to carry it out. Therefore we do not claim and do not want any hand in the operation. We do claim that we have got quite sufficient powers with regard to policy.

As regards the question of factories, my hon. friend was rather confusing in his attitude towards the factory and the relations between the factory and the Air Board. The Air Board is in no sense a manufacturing body. The whole of the supply and manufacture is in the hands of the Ministry of Munitions. But we who are concerned with the air all live in one house. We begin the day by a meeting of the officials representing the heads of all the departments, who meet in one room and compare notes, and arrange any differences which exist. This has been found to be a convenient arrangement, and in that manner any danger of friction, if there had been any—as far as I know there has been none whatever—is eliminated, and we expedite enormously all the work that has to be done; for instance, such things as exchange of machines with the army, when exchange is possible—for, as a rule, there are not enough for both—are arranged under this system of beginning work with a meeting of representatives of the heads of all the departments. The factory is an establishment which is under the orders of the Ministry of Munitions, and to that extent its relations with the Technical Department of the Air Board are precisely the same as the relations between the Technical Department of the Air Board and any other manufacturer. That is to say, if the factory makes a design, it is submitted to the technical advisers of the Air Board in precisely the same way as the designs of any other recognised manufacturer. But, like every other big factory, it has an experimental side. That experimental side is far larger than in the case of the ordinary commercial factory, and in addition to experiment and research carried on by the factory as such, it carries out any experiments in research work that may be required by the Technical Department of the Air Board.

As a proof that research work has not been dropped, I may give the numbers employed in each of these branches as compared with what it was six months ago. In experimental engineering the number is now 90, as compared with 86 six months ago. In the experimental flight department the number is 86, as compared with 83; and in the case of the research department, dealing also with aero dynamics, it is 107, as against 83; so that hon. members will see that there has been no reduction in these activities. As regards the ordering of machines, the policy of the factory is only to manufacture a sufficient number of machines to try the design and to embody any alteration which the Expedi-

tionary Force, from their experience, find necessary to deal with the other changing requirements at the front. That in practice means, as I have explained, that we get the first batch of machines of Government design made at the factory. They do not continue to produce that machine. The drawings are handed over to manufacturers to produce machines as contractors to the Government.

Mr. Butcher: Am I to understand the Royal Aircraft Factory do not produce engines? They produce machines. Is that so?

Major Baird: They have not produced anything since the hon. member was on the Investigation Committee. They have produced designs, but nothing material. I agree on this point, that you cannot have too much real talent employed on the difficult work of trying to improve the machines. Whether in private factories or in Government factories does not make any difference. The great point is to have the machine as perfect as possible. As regards the references which have been made to the necessity of having high power engines, I can assure the Committee that that is a matter of constant study, and the hon. member (Mr. Butcher) will realise from his examination of the question when he was a member of the Committee how extremely complicated and difficult it is and how many disappointments there are. I think that I have dealt with all the questions which have been brought up, except perhaps the question of promotion of men. That does not depend on us; it is entirely a matter for the Director-General.

Mr. Shirley Benn: Can the hon. gentleman say anything about getting seaplanes from America?

Major Baird: That is not being overlooked, but as my hon. friend will realise they have to take their turn with other things. It is not so much a matter of production as a matter of other claims that have to be considered.

Mr. Billing: I do not think this debate ought to be allowed to close without calling attention to the fact that there have not been 40 members present during the whole of the time the hon. and gallant gentleman has been replying to the various points that have been raised in regard to the work, the very important work, of this department. I see that there are not more than nine members present at this moment, and that has been the maximum number during the whole of the hon. gentleman's observations. The hon. and gallant gentleman, who represents the Government, has done his best to meet the various points which have been raised. He made the remark that the present conditions of the air service might be likened to the Western front on the outbreak of war, when the batmen and the cooks had to go into the fighting line; but I would like to point out to the hon. member representing the Air Board that the officers who were responsible for ordering the machines should have taken steps to see that they ordered them of the right type. The hon. gentleman also suggested that we cannot have standardised machines for reproduction for some time, yet we have a machine which has been in use for two years, and which has been a standardised type—a most inefficient type—for that period; and he now suggests that we cannot standardise a much more efficient type for the next six months. I would appeal to the Air Board to at least give us the assurance that, if they cannot withdraw the machines because there is nothing to be substituted for them at present, they will at least see to it that they order no more of them for active service. Orders have been placed, I understand, throughout the country, thus employing skilled workmen whose services could be far better utilised. That is not too much to ask the hon. gentleman, when he recognises that these machines are obsolete, or at least obsolescent, and when they are not up to the job, to stop building a type which is inefficient and unsatisfactory, and concentrate energies on the machine intended to take its place. Reference has been made to the R.E.S. machine. It is a machine which has a lot of tricks in the air, and requires to be handled by a most skilful pilot.

Design is at the bottom of the matter, and it is because those in command have supported men who have produced machines of bad design that half our troubles exist to-day. The hon. and gallant gentleman said that some hundreds of base chambers were found on delivery to be faulty. I think I am right in stating that they were of aluminium, and I submit that if one faulty casting was found in connection with a machine of that description, those responsible should have taken the trouble to make investigations and if it were found that there were not one or two, but 50 or 60 faulty castings, then I suggest that there must have been a question of design, if not of workmanship, in the case. If the hon. and gallant gentleman will look to it a little more closely—and I beg him not to take for granted anything that is said to him, but will put himself to the trouble of inquiring—I think he will find, or I shall be very surprised if he does not, that 50, or 60, or 100 castings were delivered, but the design was not materially altered. An order was given for 250 engines of another type, and they got out some 200 of these. When tested, the crank chamber burst, and they had all to be scrapped. The hon. member remarked that the Air Board is an amateur body, purely amateur body, but I should prefer to believe that is not so. There are members of the army and navy who sit at that Board, men of naval and military experience, and they at least cannot be considered amateurs, and the hon. member is in constant communication with the heads of the air service. In all my criticism with regard to this service I have been prompted by a desire to save the lives of pilots, and to offer suggestions which I thought might have some grain of constructive merit.

I would suggest to the hon. and gallant member that there is a position for someone in this country which requires filling up. The position which I suggest might be filled possibly by the Chairman of the Air Board, who, although he is an amateur, may be a strategist. That position is the command of what would be a raiding squadron as distinct from the R.N.A.S. That is

the point I have been trying to impress on this House until I wonder which of us is the more weary. I know there is considerable objection against such an appointment. Surely, if the requirements of the Army are met by the R.F.C. and those of the Navy by the R.N.A.S., there is no reason against the formation of a raiding squadron. If they do not want to have another air service, let them call it what they like—let them call it a Raiding Squadron and let one man have supreme control, with instructions to initiate air raids.

This debate has been listened to by very few members. I thank the Parliamentary Secretary for sticking it out. If he will take kindly to our constructive criticism, then I am sure we will endeavour to treat him to that rather than destructive criticism. If we feel that all our suggestions are tabooed, then there is no encouragement to continue in that kind of criticism. I should like to congratulate the hon. and learned gentleman (Mr. Butcher), who sits here and who formed one of the late Air Inquiry. It is the first time since I became a member that I really felt that some useful purpose was being achieved by the critics of air administration here when I heard him admit that the various recommendations which the Committee had put forward had not only been approved, but adopted, and that there had been some wonderful reforms on account of that inquiry. I felt that surely we members who fought for that inquiry for fourteen days as hard as we could, had not laboured in vain. I should like to thank my hon. and learned friend for the gracious tribute he paid to the critics in pointing out the enormous good brought about by the Committee of Inquiry which the critics of the air service in this House brought into being.

Mr. Lynch: I had not intended to speak, not having in any way prepared a speech, mainly because I feel that it is almost useless to speak even with reason and good sense to such a body as has been constituted to defend the interests of the Air Board. I would say by way of apology I was the first member in this House to advocate a great air fleet, a great air policy, a separate Ministry, and separate arm. That is so long ago that it seems now in the limbo of time, although it took place in the early stages of this war. But again and again, when I have come into contact with those great Departments of the State on whose activities the very life of the nation depends, I have been astonished, even in the estimate I would like to form of Englishmen, of their lack of brains and lack of real intellectual capacity, and the invariable habit of trying to shoulder off responsibility and to hide themselves behind all kinds of shams and make-believes and makeshifts, which I know are the great stock-in-trade of politicians. It is easy to make a member of the Front Bench. He has to learn a few tricks in answering questions. He has to put on a surface and a façade. He has to be dexterous in the use of hypocrisy and semi-official lies. But it is a very different thing to be able to produce a man who has a scientific brain and who will look at a problem in its essential character, and endeavour not to hoodwink Parliament or the people, but to solve that problem in its real validity, and to make that solution tell in the safety of the nation. Such a man we have not produced in any one of the great Departments of State. My hon. friend who has just sat down (Mr. Billing) has been attacked again and again, he has been sneered at in this House, and he has been treated most unfairly. I do not hold a brief for him, because he is very well able to defend himself, but I will say that it is greatly due to the driving force which he has brought into these debates and to the suggestions which he has made, even though at times they have been couched in a somewhat rhetorical vein, that we have had that degree of activity which has been manifested in the governing circles which produced the Air Board. That Air Board itself is a sham. I dare say they know it themselves, and if they do not know it, that is a still further proof of their want of capacity. We have first of all the army with its air service, a very necessary air service, but this army, whatever its great qualities have been—and I am so far from wishing to belittle their great services that I am filled with absolute admiration for the Army until we reach a certain level of command—ought not to be left perfectly free to develop that function of air service, which, remember, it never invented itself and which no military man, although war has been going on since the dawn of time, ever allowed to enter his brain. The same remarks apply to the navy. Military men, and I think men in all Government Departments, seem gradually to train themselves into a kind of frame of mind, marked by routine, bound down by red tape, and dominated by tradition, which seems to deprive them of any valid faculty of thought at all.

The Deputy-Chairman (Mr. Maclean): The hon. member seems to me to be using this particular Vote in Committee for the purpose of an attack on Administrations in general and on this Administration in particular. Will he kindly confine himself to the question before the Committee?

Mr. Lynch: I was trying to account for what at first blush seems an extraordinary phenomenon, that after nearly three years of war the mountain has laboured to produce this mouse of an Air Board, but I will come now to a definite and concrete point, and that is that even now, seeing that this war may last a long time—and remember that that is the calculation of the Americans, who I hope will bring some brain power into it—the Government should make an effort to rise out of this thralldom of tradition and definitely lay the foundations of a new and separate striking force for the air of great magnitude, greater than has hitherto ever been imagined, and proceed from to-morrow to lay it down on definite lines, so that that great imagination may become a reality, and if they are able to grasp that idea, to face that problem in its whole character, and even from the ground to lay the foundations on which it shall be built, they may finish by bringing into a reality a force which may be one of the decisive factors in the determination of this war.

QUESTIONS IN PARLIAMENT.

Freiburg Air Raid and Reprisals.

MR. MOLTENO in the House of Commons on April 24th asked the Prime Minister whether the bombing of Freiburg, announced by the Admiralty as having taken place on April 14th as a reprisal for the sinking of British hospital ships, is in accord with assurances given to this House from time to time; and whether it is part of a new policy of entering into a competition with the enemy by way of reprisals?

Mr. Bonar Law: I have nothing to add to the reply which I gave on Thursday last to the hon. member for Mid-Armagh.

Mr. Molteno: Seeing that the casualties incurred included 26 women and children killed and injured, does the War Cabinet think that it would be in accordance with the high principles of humanity if fighting men are withdrawn from fighting the armed forces of the enemy to attack the civil population, when casualties of this kind are likely to occur, in view of the fact that women and children are now in the majority?

Mr. Bonar Law: My hon. friend must be aware that these considerations were fully weighed by the Government before they took the course which was taken.

Mr. Pringle: Has the Government made up its mind as to what it will consider a test of the success of this policy of reprisal?

Mr. France: Is not the best reprisal of all to fight and beat the Germans in accordance with British traditions both on land and sea?

Mr. Bonar Law: Yes; but we think also that in certain circumstances reprisals are inevitable.

Colonel C. Lowther asked whether His Majesty's Government will take immediate steps to inform the German Government that unless their general military staff spare Laon Cathedral and other buildings of purely aesthetic,

but of no military value, reprisals will be taken, when the opportunity permits upon Cologne Cathedral and other monuments cherished by the German people for their beauty and historic interest?

Mr. Bonar Law: The Government do not see their way to adopt the suggestion of my hon. friend.

Colonel Lowther: May I ask whether these acts of vandalism will be allowed to continue without any protest or any reprisal?

Mr. Bonar Law: They will not be allowed to continue if we can stop them. This whole question of reprisals is a very difficult one. I do not think the hon. member's suggestion is practical.

Mr. France asked the First Lord of the Admiralty if he is now able to give any further details of the result of the reprisal bombardment of Freiburg on 14th April; if he can state how many women and children were killed; and if he intends to repeat reprisals of this kind as a means of safeguarding hospital ships.

Dr. Macnamara: No details are known beyond those already published in the German Press. I am not in a position to answer the second part of the question.

Aircraft Manufacturers and Excess Profits.

CAPTAIN BURGONNE asked the Chancellor of the Exchequer whether he has received a deputation on behalf of the small number of pioneer aircraft manufacturing firms in reference to the hardship they incur owing to the Munition Act and the Finance Act, in view of the pioneer work done by these firms before the war, the importance now given to aviation, the signal services they have rendered to the nation, the inadequate standard years they can show from their pre-war accounts, the unfavourable comparison with firms building

aircraft only since the war but who can show good pre-war standards on other products, and the necessity that the designing firms shall be firmly established during the war if they are to be of service after the War; and whether he can see his way to establish both for the Munition Act and the Finance Act the first complete war years' accounts of each firm as their standard year?

Mr. Bonar Law: The answer to the first part of the question is in the affirmative. As regards the second part it would not be possible to adopt the suggestion made by my hon. and gallant friend without a complete departure from the principles of the Excess Profits Duty. Under the existing law it is open to any class of business to make an application to the Board of Referees for an increase of the statutory percentage on capital.

Machines for Artillery Reconnaissance.

MR. BILLING on April 25th asked the Under-Secretary of State for War whether any machines of the BE 2C, BE 2D, or BE 2E types have been employed over enemy territory during the recent offensive operations on the Western front; and, if so, whether it is proposed to continue so to employ them.

The Parliamentary Secretary to the Air Board (Major Baird): The types of machine referred to in the Question are mainly employed for artillery reconnaissance, for the carrying out of which it is necessary that they should fly over enemy territory. The answer to the second part of the question is in the affirmative. I would add—and on this point I take the opportunity of correcting an answer which I gave to the hon. member on 20th March—that these machines are also used for bombing expeditions when large operations are in progress.

Mr. Billing: Will the hon. and gallant gentleman have inquiries made whether the machines are fit to send on bombing expeditions in view of the enormous losses they have suffered?

Major Baird: In the view of the officers responsible they are fit for this sort of work.



"DOING THEIR JOB."

MR. PHILIP GIBBS, writing to the *Daily Telegraph* on April 26th, said:—

"One thing seems certain to me. The enemy must either regain some of his lost positions or get back another 3 miles or so to the main Hindenburg line, if he wishes to escape from enormous losses under our constant gunfire, directed by complete observation, of his present positions.

"In the daily official reports the brief picture has been given of the battle which has raged in the skies while the earth men have been struggling below. Truly, during these last few days our air service has fought very wonderfully, and some day one of these young men who go flying out to engage an enemy in the clouds or to search out and signal hostile batteries or to stoop low and scatter infantry and machine gunners with a shower of bullets, must write the tale of it all. There have been hours when I have heard overhead a continued tattoo of Lewis guns, and when a great sweep of sky has been tracked out with white shrapnel clouds following our flying squadrons engaged hotly with hostile machines. One cannot follow the progress of these aerial battles; it is only rarely that one can distinguish an enemy machine from ours except by the cloudlets of our anti-aircraft barrage. But far and high one sees the daring specks chasing through the blue of the sky, touched sometimes by sunlight, so that for a moment they are all golden or glistening or white as snowflakes, and down to one comes the loud drone of the engines and the little hammer knock of the Lewis guns. Our soldiers on the march stare up at that war above their heads, so aloof from them, so dream-like. Men on supply columns get their glasses out, and laugh when one of our kite balloons is hauled down suddenly with great haste. 'Old Rupert has got the wind up,' they say. 'A Boche plane must be sneaking round.'

"It is no joke when a German airman descends out of a cloud and hovers over a battery, signally back to his guns. I was in such a situation the other day and had to crouch with the gunners below a bank while shrapnel bullets from our own 'Archies' whipped the ground about. Red wings have come into the sky, for the new German fighting machines have crimson planes, so that they look like butterflies when the sun is on them. The enemy airmen have been trying to compete with our own by swooping low above marching troops and gun teams, and using their machine guns in a way which adds new perils to war. But though they fight behind their own lines with great skill and courage, they do not come over our country in any such numbers as our men invade theirs. This is not a prejudiced statement, but the strict truth, and our airmen go daily far back across the German lines, taking thousands of photos., engaging the enemy squadrons, so that they are held back from the line of battle, and dropping tons of explosives upon ammunition dumps, railheads and transport.

"These boys, for they are absurdly young in average age, take all these deadly risks, and do all this work of terror with the same spirit as the young gentlemen of England rode out with Lord Chandos and Sir Walter Manny to seek combat with the French knights 600 years ago along the roads where our modern men-at-arms go marching to-day. During this recent fighting one of them challenged a German Albatros, who accepted the fight, and for an hour they did every trick

Mr. Billing: Is the hon. and gallant gentleman aware that it takes them 50 minutes to climb 5,000 feet, and their speed is 70 miles an hour?

Major Baird: It is impossible to discuss this by question and answer. The hon. member will have an opportunity.

Capt. Leefe Robinson, V.C.

MR. BILLING asked the Under-Secretary for War on what type of machine was Captain Leefe Robinson, V.C., flying when he was shot down.

Major Baird: The type of machine on which this very gallant officer was flying when he was shot down was a Bristol Fighter.

Mr. Billing: Is the hon. and gallant gentleman aware that this officer had no experience fighting in this type of machine?

Major Baird: I do not think that is so. I will inquire.

Sir C. Hobhouse: Is it not a fact that this officer is now discovered to be alive and a prisoner in German hands?

Major Baird: We are not quite sure whether he is alive, but there is still reason to hope he may be, but it is by no means certain.

Allocation of Aeroplanes to R.N.A.S. and R.F.C.

MR. BILLING asked the Parliamentary representative for the Air Board whether the R.F.C. have a prior claim to the R.N.A.S. to all the latest types of aeroplane at present under construction in this country; and whether it is proposed that all such machines of high efficiency now on order for the R.N.A.S. shall be transferred to the R.F.C.?

Major Baird: The answer to both parts of the question is in the negative. Every endeavour is made to meet the requirements of both the R.N.A.S. and the R.F.C. Where these requirements cannot be met in full the supply available is allocated by the Air Board after full consideration of the respective needs of the two services.

known to flying—stalling, banking, side-slipping, looping—in order to get in first shot. It was the German who tired first, though he showed himself master of his machine. There are boys in our air service who have killed six or seven Germans in single combat, a few who have accounted for many more, and go off again for a morning's hunting of men as though on a grand adventure. Yet they know the risks and the fortunes of war. They cannot have all the luck all the time. When the turn comes it is quick to end, or if hit and left alive they do amazing things up there in the high skies to save the final crash. A few evenings ago two of our young officers were attacked by five hostile aircraft, and both were wounded, one in seven places, but they destroyed one of the German aeroplanes and landed safely, though their own machine was pierced by many bullets. On another evening of the battle of Arras two hostile aircraft were engaged by one of ours and forced to land, though one of the officers had his collar bone broken by a machine gun bullet. Day after day these episodes are repeated, and machines and officers do not come home. But when another dawn breaks our air squadrons rise again and fly over the storm of battle-fields as I see them on the wing over Arras and away.

"There is no romance except when the tale is told on the night of bombing raids, no exultant joy in struggling through a snowstorm to drop high explosives on a distant town. During this battle of Arras our airmen have made thousands of flights over the enemy's lines, have engaged in hundreds of combats with hostile squadrons, and, at the cost of their own lives in many cases, have saved our infantry great losses by keeping down the fire of the German batteries, destroying their kite balloons, signalling the preparations for German counter-attacks, photographing the enemy's trenches and positions, and blinding his own power of observation to some extent at least by chasing his aeroplanes away from the lines. On a day when our infantry is not hard pressed, it is good to pay this tribute to the flying men whose exploits are not much recorded, though they are always overhead, and though the droning song of their engines is always the accompaniment of the battle down below."

The *Times* correspondent at the War Correspondents' Headquarters, in his despatch on April 24th, says:—

"The clearness of the air continues favourable to aerial activity, and the official *communiqué* yesterday told you how well we have been doing. This, however, is only a small part of the story.

"The great outstanding fact is that our observers continue to do their job and the enemy's do not. That is to say, that all day, unceasingly, our machines are patrolling the battlefield, observing, photographing, reporting and assisting the guns. The enemy machines are not doing so. Far away on the other side of the line our fighting machines are engaging the German fighters. We necessarily lose some machines. Sometimes one of their fighting machines reaches the battlefield and attacks one of our observation aeroplanes, when the odds necessarily are largely against our man.

"All these things, however, are only details compared with the great essential fact that we remain in control of the observation of the battlefield, and the result is seen in the deadly work of our artillery and the success of our attacks."

THE USE AND ABUSE OF STEEL.

By Lieut.-Col. R. K. BAGNALL-WILD and Lieut. E. W. BIRCH.

(Concluded from page 402.)

DESIGNERS hardly seem to pay sufficient attention to this matter, and misunderstandings have occurred as regards hardening tests for the case-hardened surface. Steel makers know that with a high nickel case-hardened steel or a nickel chrome case-hardening steel the same glass-hard surface cannot safely be obtained as with the common carbon case-hardening steel. It is therefore necessary for the designer to consider whether he wishes to obtain the properties of a nickel steel in that portion of the metal immediately underneath the case, or whether he wishes to have it with such properties as

case has recently occurred where a department was blamed for passing an alloy steel which is supposed to have given some 55 tons ultimate, and was found by Brinell test to be of some 28 to 30 tons.

It is quite obvious that a batch of steel represented by the original test piece which gave the higher figure, could not possibly give the lower figure, even as rolled, the inference being that a mix-up had occurred in the firm's stores. It is absolutely essential that when a consignment of steel arrives at a works, care be taken to store it in such a way that the

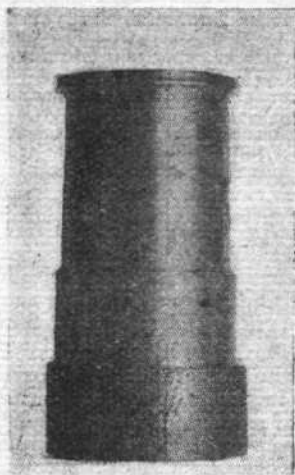


Fig. 17.

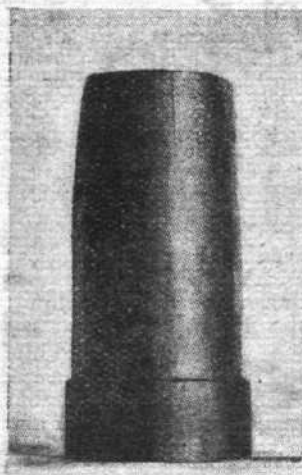


Fig. 18.

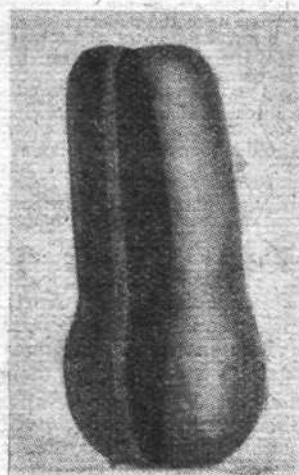


Fig. 19.



Fig. 20.

Fig. 17.—Cracked nickel chrome bar. Crack extended into centre of bar. Fig. 18.—Cracked nickel chrome bar. Fig. 19.—Turnbuckle from nickel chrome bar. Extensive pitting, opened out on hammering ends. Fig. 20.—Nickel chrome bar. Cracks developed during tensile test.

can be obtained with a carbon steel, in the latter case obtaining a harder surface.

Specifications exist which call for practically a glass-hard surface coupled with physical properties requiring the use of an alloy steel of a composition that cannot possibly be expected to give this surface.

A most important point at the moment is output. The steel maker is using every endeavour to produce steel free from roaks, flaws, and cracks, but it is a fact that in spite of care, a quantity of faulty steel is delivered to the machine shop, and sometimes a large amount of work is done on it before the

test report representing that steel may at any time be correlated with it. An Inspection Branch is not a Stores Branch; the duty therefore falls on the contractor's stores.

One point of considerable difficulty has been experienced in the making of bolts, nuts and screwed parts. It is essential for aeroplane work that certain bolts should be made of alloy steel with a comparatively high tensile strength. Such steel is obviously more difficult, and in some cases almost impossible, to thread in automatics. In the case of a steel which is used very largely for aeronautical work (of some 50 tons tensile) there is no doubt that it takes about five times as long

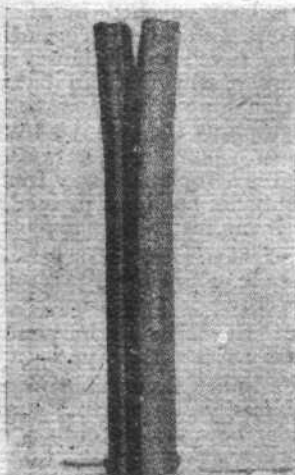


Fig. 21.



Fig. 22.

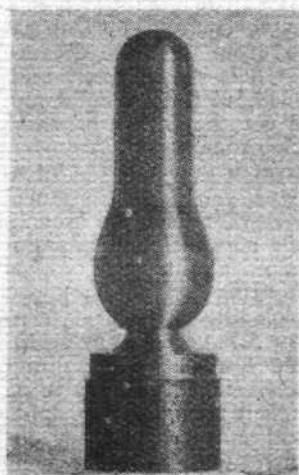


Fig. 23.

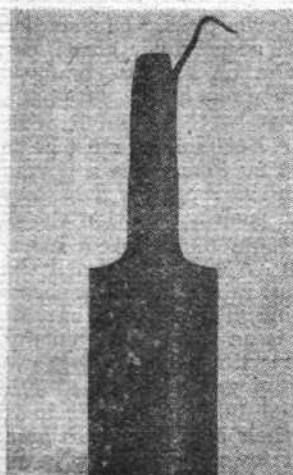


Fig. 24.

Fig. 21.—Partly machined nickel chrome bar, showing internal flaw. Fig. 22.—Tensile test piece, showing metal tongue. Fig. 23.—Partly machined turnbuckle from cracked bar. Fig. 24.—Tensile specimen, showing tongue due to effect in rolling.

defects are found. Detailed inspection can do a great deal to prevent such steel leaving the steel maker; numbers of examples, however, can be put forward showing that much labour in this country is at present being wasted in machining faulty steel. (Figs. 17-28.)

In connection with this, inspectors are often blamed for matters which have nothing whatever to do with them. A

to put through an automatic as a common carbon steel, while the wear and tear on the dies is also very much greater.

It is considered that firms making screwed parts are to blame in not having realised this fact at an earlier date, but it is hardly fair to the designer for the manufacturer to complain after acceptance of a contract. It is obvious that bolts made of high tensile steel must be more expensive than

those made in medium carbon steel. The screw maker should have tendered accordingly in the first place, and not waste time in grumbling, and what is far more important, in failing to give the output that he had promised.

With regard to bolts required in mild steel, or rather what is so termed in aeronautical manufacture (35 tons ultimate), very great trouble has been experienced in certain directions. A large quantity of steel exists in this country which has a sulphur and phosphorus content in excess of 0.1 per cent. Such steel is well beloved by the screw maker, it cuts like cheese, does not wear out the dies, and allows a well-cut thread to be produced; on the other hand, it is absolutely dangerous

is most essential for the correct working temperatures to be observed, and also that the right amount of work is done on the metal. The chief cause of failure with stampings in alloy steel has been, due to the overheating of the steel. In some cases this can be rectified by heat-treatment, but in the majority of cases the stamping is spoilt. The authors consider that far too little attention is given by the stampers to the metallurgical side of the problem.

In many cases all they seem concerned with is to get as many stampings out as possible, irrespective of any special

Fig. 27.—Nickel chrome bar split during machining.

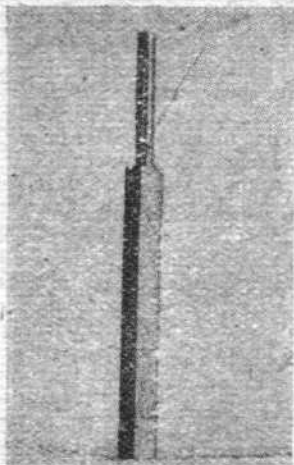


Fig. 25.

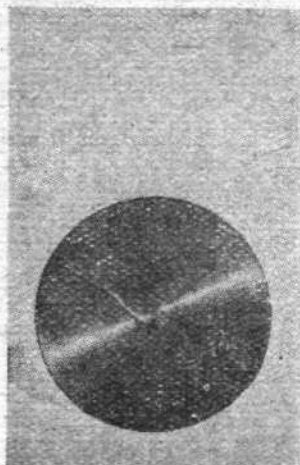


Fig. 26.

Fig. 25.—Bright drawn hexagon bar, internal roak, no external indication. (Mild steel.) Fig. 26.—Nickel chrome bar cracked during rolling.

for aeronautical purposes (it is not intended to criticise it for other uses). It is possible to keep down the sulphur and phosphorus content in crank steel to 0.03 per cent., though steel makers have asked a little latitude in this direction, which has been granted, but which it is very gratifying to note, is seldom if ever required. On the other hand, with the milder steels, a latitude for war production purposes of sulphur and phosphorus up to 0.06 per cent. has been allowed.

Military specifications for the milder steels formerly did not include an analysis, neither did they include an impact test. It has now been found necessary to include either one or the other. It is obvious that a limit on the chemical content of sulphur and phosphorus will eliminate the dangers attending the use of steel high in these constituents. It is also interesting to note that an impact test of even 15 ft. lb. on the Izod machine will have the effect of keeping these constituents

precautions which should be taken. The limits of the steel should be better realised, and it must be recognised that it is not possible for these alloy steels to be handled in the same manner as mild steel.

Stampings to be machined all over and designed to approximately finished external dimensions are almost impossible to jig, and the result is that although the stampings are absolutely to drawing and capable of being machined, it is commercially impossible to guarantee a correct jigging so as to avoid scrap.

In the earlier days the designers had apparently one point of view when they issued stamping drawings, namely, that of obtaining stampings requiring a minimum of machining. An example occurred with connecting rods. This caused a great deal of trouble, and it was not until the radii were more than doubled and the stampings generally thickened up so as to

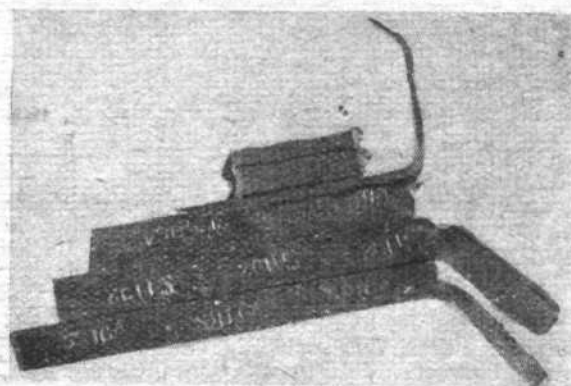


Fig. 28.—Izod specimens from cracked nickel chrome bars.



Fig. 29.



Fig. 30.



Fig. 31.

Fig. 29.—Stamped hollow head valve in alloy steel, showing flow of grain round head. Fig. 30.—Similar valve to Fig. 29, turned from solid bar. Fig. 31.—Alloy steel valve stamping; flow of metal in head not very satisfactory.

low. With a percentage in excess of 0.06 practically no impact figure is obtained with this steel as used commercially.

The use of alloy steels for drop stampings has led to many disastrous results. As previously pointed out, these steels are delicate, and require most careful manipulation. The stamper, when using mild steel, ran very little risk of burning it, and experienced no difficulty in making it fill the dies. It has taken a long time for the majority of stampers to recognise that alloy steels cannot be treated as easily, that it

give what might be termed easy "flow lines" that difficulties were avoided.

An example of a different nature occurs in the stamping of valves. The requirements are not altogether understood by the stampers or designers. In certain cases very satisfactory stampings have been produced, but in the majority of cases quite the reverse.

The essential condition in these stampings is that the flow of the metal should follow the contour of the head of the valve,

and it is most important that at the radius where the stem joins the head, the flow of metal should be parallel to the radius after machining. This point is overlooked by the designer who prepares the stamping drawing. If a large

part can be obtained. If from a forging, the test piece is more conveniently arranged for at EF, as shown in Fig. 36; this also gives a very close representation of the material, and is very largely adopted.



Fig. 32.

Fig. 33.

Fig. 32.—Alloy steel valve stamping. Fig. 33.—Valve stamping in wrought iron, showing satisfactory flow of metal in head.

radius is allowed at this pint and the stamper correctly stamps to the drawing, the metal will certainly follow the radius, but on machining to the smaller radius it will be found that the grain of the metal has been broken owing to the final radius not being parallel to the flow of the metal. A number of examples of correct and incorrect forms of stampings are shown in Figs. 29-33.

Some considerable amount of trouble has been experienced with stampings that have been heat-treated to give figures in the neighbourhood of 60 tons per sq. in. ultimate tensile

Experience of air-hardened steel, when used by stampers, shows that it is more often than not entirely misunderstood by the users. Cases have occurred where an air-hardening steel has been found hard to machine, and has been heat-treated by the firm in order to soften it. In spite of three or four heat-treatments, the steel became harder and harder owing to the lack of knowledge of the material being dealt with.

In the case of stampings, an air-hardening steel is somewhat difficult to manipulate, and it is clear that under present conditions the use of this class of steel is conducive to excessive scrap and uneconomical working.

It is therefore submitted that designers should reconsider their specifications.

There is no doubt that in the average engine and aeroplane of to-day—and, the authors think, of to-morrow—air-hardening steel is not as essential as designers imagine. A steel which will give some 70 tons ultimate, with about 17 per cent. elongation, will fulfil requirements, provided the designer uses discrimination. A medium nickel alloy steel with moderate chromium, provided the carbon is kept about 0.3 per cent., will satisfy the majority of requirements.

A considerable diversity of opinion exists as to the steel required for gear wheels.

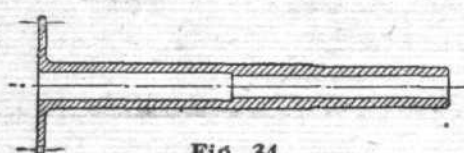


Fig. 34.

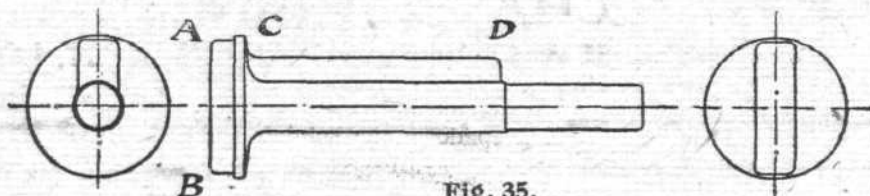


Fig. 35.

stress. Such stampings are quite capable of being machined, but obviously they do not machine as readily and as quickly as the same stampings in the annealed condition. There is a big tendency for the machine shop foreman to pop them into the fire and let them down without saying anything to anybody. Fortunately in most cases this most reprehensible practice has been discovered. The manufacturer must definitely determine whether he requires the stamping to be supplied to him in the heat-treated condition to give the results required in the article produced, or whether he requires the stamping to be annealed, and himself to arrange for heat-treatment after machining. Much confusion unfortunately exists in the minds of many on this point. It is necessary that a stamping should be heat-treated after stamping; whether it is then normalised, machined, and subsequently heat-treated, or whether it is heat-treated and subsequently machined in that condition is a matter for the machine shop manager to determine.

The testing of stampings presents a rather difficult problem, concerning which some of the most extraordinary misconceptions have occurred. It is necessary for the purchaser to know that the stampings are in the condition required by the specification. Where the stampings and test pieces are heat-treated together, the stampings are passed or rejected in accordance with the test results obtained. This is not altogether satisfactory, as the test pieces may or may not have received the same amount of work as the stampings. In the case of larger stampings, the test piece should form part of the stamping; thus every stamping would have a test piece, but only a proportion of such test pieces would have to be used. In other words, selective inspection is adopted. There is some difficulty in directly locating the place of attachment of the test piece. On a large stamping it will have some considerable amount of work done upon it, but it should certainly not be placed, as has actually occurred in drawings put forward by a designer, across the grain. Those who are accustomed to deal with the testing of sheet steel know well the difference obtained from test pieces cut with the direction of rolling and across it. The same consideration must be taken into account by the designer in locating the test piece on a stamping.

As an example, the part shown in Fig. 34 is machined from a stamping shown in Fig. 35. The designer placed the test piece at AB, whereas if made as shown at CD, some reasonable representation of the condition of the material in the finished

The evidence available tends to show that a case-hardened gear wheel is more suitable than the air-hardened one under these special conditions. A very large number of gear wheels have been examined, and although perfectly truly aligned and centred, the wear is not equally distributed along the tooth

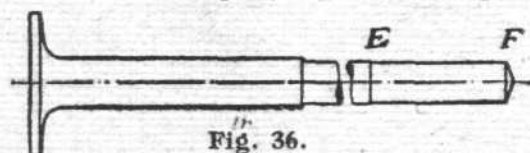


Fig. 36.

surface. There is evidence that periodic spot contact instead of line contact takes place.

Another example of trouble is illustrated in Fig. 37. At one time this resulted in a considerable loss of output, and after careful investigation, the cause of the trouble was found to be due to the manganese content of the steel, which was a straight carbon, being too low. On increasing the manganese no further difficulty was experienced.

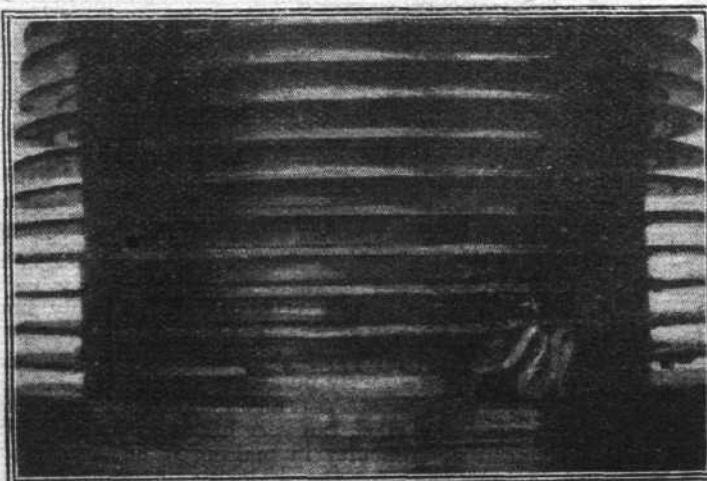


Fig. 37.—Aero engine cylinder, showing tearing of fins during machining.

The British Air Services

PER ARDUA AD ASTRA

Royal Naval Air Service.

Admiralty, April 24th.
W. B. Bonsor granted temp. commission as Lieut., R.N.V.R., and appointed to the "President," additional, for R.N.A.S., date April 23rd.

Sub-Lieuts., R.N.: R. B. Gibb, H. Gartside-Tippinge, G. S. Greenland, N. Grabowsky, E. B. Devereux, J. W. Havers, A. C. Jelf, G. L. Lowes, E. L. D. Bartley, S. B. Harris, G. R. I. Snow and M. McMaster graded at Prob. Flight Sub-Lieuts., date Mar. 1st.

The under-mentioned have been entered as Flight Officers and appointed to the "President," additional, for R.N.A.S., to date as stated: E. A. B. Wimbush (temp. prob.), May 6th; and H. Cooper (temp.), date April 29th.

Admiralty, April 26th.
Temp. Lieuts., R.N.V.R.: R. G. Fife and R. D. Ronald transferred to the R.N.A.S., date April 25th.

Temp. 2nd Lieut. (R.M.) G. H. Moir granted temp. commission as Sub-Lieut., R.N.V.R., seniority April 23rd.

The following have been entered as Temp. Prob. Flight Officers, date as stated: R. J. Brown, April 19th; R. B. Stocken and H. St. J. E. Youens, May 6th; D. G. Batterbury, April 21st; and A. B. Monk, May 5th.

The following Temp. Prob. Flight Officers promoted to Temp. Flight Sub-Lieuts., seniority as stated: H. C. Lemon, Jan. 27th; J. C. Stevens, Mar. 17th; E. F. Burrows, Mar. 21st; C. F. Dash, L. T. Clemence and C. L. Young, Feb. 18th; E. G. Harwood, Feb. 4th; R. L. Brown and J. S. de Wilde, April 4th.

Warrant Officer (II) T. O'Connor promoted to Flight-Lieut., seniority April 24th.

G. H. F. Catherall granted temp. commission as Lieut., R.N.V.R., seniority April 14th.

Admiralty, April 27th.
Lieut.-Comdr. (ret.) M. C. Brotherton graded as Flight-Comdr., and appointed to the "President," additional, for R.N.A.S., date April 30th.

Warrant Officer, 2nd grade, S. T. Freeman transferred to the rank of Prob. Flight Officer, date April 30th.

Admiralty, April 30th.
Squadn.-Comdr. E. F. Briggs, D.S.O., promoted to Wing Comdr., seniority Dec. 31st.

Royal Flying Corps (Military Wing).

London Gazette, April 24th.
Flying Officers.—Temp. Lieut. L. C. Legge-Wilkinson, attd. S. Lan. R., and to be transf. to Gen. List; Mar. 13th. Mar. 30th: 2nd Lieut. (Temp. Lieut.) C. S. Workman, M.C., Sco. Rif., from a Flying Officer (Ob.), with seniority from July 6th; 2nd Lieut. C. L. Veitch, N. Lan. R. (T.F.), and to be sec'd.; 2nd Lieut. Graham M. Robertson, High. L.I. (T.F.), and to be sec'd.; Temp. 2nd Lieut. (on prob.) E. S. Howard, R.E. Mar. 31st: Lieut. J. A. Menzies, Can. Gen. List; Temp. 2nd Lieut. E. P. Wykes, Gen. List; 2nd Lieut. C. F. Horsley, Norf. R., and to be sec'd.; 2nd Lieut. (Temp. Lieut.) R. Musgrave, W. York. R. (T.F.), and to be sec'd.; Temp. 2nd Lieut. A. V. Milton, E. York. R., and to be transf. to Gen. List; Temp. 2nd Lieut. L. Edens, Newfoundland R. April 1st: Temp. 2nd Lieut. C. T. Warman, Gen. List; Temp. 2nd Lieut. (on prob.) A. V. Hurley, Gen. List. Temp. 2nd Lieut. (on prob.) F. V. Way, Gen. List; April 2nd.

Flying Officers (Observers).—Temp. 2nd Lieut. (on ob.) W. A. L. Spencer, Gen. List; Mar. 6th, seniority Oct. 6th. Temp. 2nd Lieut. N. J. Brebner, Garr. Bn., Linc. R., and to be transf. to Gen. List; Mar. 10th, seniority Nov. 25th. 2nd Lieut. P. E. H. Van Baerle, W. York. R. (T.F.), and to be sec'd.; Mar. 17th, seniority Dec. 2nd. 2nd Lieut. W. S. Gardner, R.A., and to be sec'd.; Mar. 5th, seniority Dec. 2nd. 2nd Lieut. A. F. Gibson, Leins. R., S.R., from R. Ir. Rif. (since killed in action), and to be sec'd.; Mar. 23rd, seniority Dec. 7th. Temp. 2nd Lieut. H. M. Headley, R.A., and to be transf. to Gen. List; Mar. 10th, seniority Dec. 15th. 2nd Lieut. T. F. Steele, Arg. and Suthd. Highrs., S.R., and to be sec'd.; April 2nd, seniority Dec. 21st. Lieut. J. F. Ferguson, Can. Pioneer Bn.; Feb. 25th, seniority Dec. 31st. Temp. 2nd Lieut. R. H. Lownds, Gen. List; Mar. 16th, seniority Jan. 25th. Temp. 2nd Lieut. A. D. Collins, Gen. List; Mar. 22nd, seniority Jan. 26th. Temp. 2nd Lieut. (on prob.) F. Allinson, R.W. Surr. R., and to be transf. to Gen. List; Mar. 24th, seniority Jan. 29th. Mar. 23rd: 2nd Lieut. A. A. Baerlein, R.F.A., S.R., seniority Feb. 16th; Lieut. H. S. Whiteside, Can. Mach. Gun Corps, seniority Feb. 17th; Temp. 2nd Lieut. (on prob.) L. J. Anstey, R.A., and to be transf. to Gen. List; April 1st, seniority Feb. 23rd.

Equipment Officer, 3rd Class.—Temp. 2nd Lieut. R. M. Brown, Gen. List; Mar. 16th.

Experimental Officer, 3rd Class (graded as an Equipment Officer, 3rd Class).—2nd Lieut. G. W. M. Whitton, S.R.; Jan. 25th.

Memorandum.—Acting Corpl. H. W. Denton from R.F.C., to be Temp. 2nd Lieut. (on prob.) for duty with R.F.C.; Mar. 22nd.

Special Reserve of Officers.—The under-mentioned, from an Officer Cadet Unit, to be 2nd Lieuts. (on prob.)—April 4th: C. G. Fenton and F. C. Penny. April 5th: J. Gitsam, F. H. Hall, J. M. Hancock, T. W. Kerr and E. B. Hedley. April 13th: J. S. D. Angus, S. J. Brewer, K. W. Cocking, D. Deakin, G. Knight, A. T. W. Lindsay and E. J. Stephens.

London Gazette Supplement, April 25th.
Group Commander.—Major (Temp. Lieut.-Col.) T. C. R. Higgins, R. Lanc. R., from a Wing Comdr., and to be Temp. Col. whilst so employed; Mar. 6th.

Squadron Commander.—Lieut. (Temp. Capt.) O. D. Filley, M.C., S.R., from a Flight-Comdr., and to be Temp. Major whilst so employed; April 10th.

Flying Officers.—The appointment of Temp. 2nd Lieut. S. Cockerell, Gen. List, notified in the *Gazette* of Mar. 22nd, is ante-dated to Oct. 27th. 2nd Lieut. F. Adams, Gen. List; Dec. 17th. (Substituted for the notification in the *Gazette* of Jan. 1st.) Mar. 23rd: 2nd Lieut. (Temp. Lieut.) S. S. Hume, Yeo. (T.F.), from a Flying Officer (Ob.), seniority June 28th; 2nd Lieut. D. J. de A. Bird, R.F.A. (T.F.), and to be sec'd. Mar. 24th: Lieut. C. P. G. Gordon, S. Staff. R., S.R., and to be sec'd.; Temp. 2nd Lieut. E. L. L. Turnbull, R.E.; Lieut. (Temp. Capt.) A. L. Chick, Essex R. (T.F.), and to be sec'd.; Temp. 2nd Lieut. (on prob.) H. E. F. Russell, Gen. List. 2nd Lieut. (on prob.) C. W. McKissock, S.R.; Mar. 25th. Temp. 2nd Lieut. D. P. Farley, R. W. Surr. R.; Mar. 27th. Mar. 29th: 2nd Lieut. G. M. Carter, R. War. R., and to be sec'd.; 2nd Lieut. (on prob.) F. E. Barker, Yeo. (T.F.), and to be sec'd.; Temp. 2nd Lieut. (on prob.) F. W. Maclean, Gen. List; 2nd Lieut. (Temp. Lieut.) W. L. S. Keith-Jopp, Rif. Brig. (T.F.), and to be sec'd.; Temp. 2nd Lieut. A. L. Messenger, Gen. List; Temp. 2nd Lieut. (on prob.) P. S. Bell, Gen. List. Mar. 30th: Lieut. (Temp. Capt.) L. G. Bain, Newfoundland R.; Temp. 2nd Lieut. W. R. Balden, Gen. List. Mar. 31st: 2nd Lieut. (on prob.) F. W. Balls, Suff. R., S.R., and to be sec'd.; Temp. 2nd Lieut. H. D. Davies, attd. E. York. R., and to be transf. to Gen. List; 2nd Lieut. W. B. Ives, W. York. R., S.R., and to be sec'd.; Temp. 2nd Lieut. I. ap R. Owen,

Gen. List; Temp. 2nd Lieut. (on prob.) R. P. O. Weekes, Gen. List; and Lieut. (on prob.) J. W. Boulter, S.R.; Temp. 2nd Lieut. (on prob.) G. E. Woodhams, attd. Middx. R., and to be transf. to Gen. List; Lieut. (Temp. Capt.) G. Chadwick, Manch. R. (T.F.), and to be sec'd.; 2nd Lieut. (on prob.) F. H. M. Eberlin, Yorks. L.I., S.R., and to be sec'd.; 2nd Lieut. T. P. Middleton, R.F.A. (T.F.), and to be sec'd.; Temp. 2nd Lieut. A. W. Mason, Gen. List; Temp. 2nd Lieut. G. S. Green, Gen. List. Temp. 2nd Lieut. (on prob.) R. L. Curtis, Gen. List. April 1st: 2nd Lieut. J. H. G. Womersley, R.G.A. (T.F.); Temp. 2nd Lieut. C. J. S. Lea, Hamps. R., and to be transf. to Gen. List; Temp. 2nd Lieut. D. Dalgliesh, Gen. List; 2nd Lieut. (on prob.) A. E. Crisp, Norf. R. (T.F.), and to be sec'd.; Temp. 2nd Lieut. F. H. Woodlams, Gen. List. April 2nd: Temp. 2nd Lieut. C. G. Moore, R. Fus., and to be transf. to Gen. List; 2nd Lieut. G. H. Hooper, R.E. (T.F.), and to be sec'd.; 2nd Lieut. (on prob.) R. W. G. West, S. Staff. R. (T.F.), and to be sec'd.; 2nd Lieut. (on prob.) A. S. Turner, S.R. Temp. 2nd Lieut. A. E. Godfrey, Gen. List, from a Flying Officer (Ob.), April 3rd, seniority Sept. 7th. 2nd Lieut. (Temp. Lieut.) C. H. Witty, York. and Lanc. R. (T.F.), and to be sec'd. April 4th. April 5th: 2nd Lieut. C. G. Holman, K. O. Sco. Bord., from a Flying Officer (Ob.), seniority April 23rd, 1916, and to be sec'd.; 2nd Lieut. J. M. Leach, York. R., and to be sec'd.

Flying Officers (Observers).—The date of seniority of Temp. 2nd Lieut. (on prob.) L. L. Brown, Gen. List, is Oct. 17th, and not as in the *Gazette* of Mar. 8th. Lieut. M. K. Parlee, Can. Inf. Bn.; Mar. 31st, seniority Nov. 6th. 2nd Lieut. G. L. Barritt, Linc. R. (T.F.), and to be sec'd.; Mar. 27th, seniority Dec. 2nd. Mar. 20th, seniority Dec. 2nd: 2nd Lieut. (on prob.) V. D. Fernald, R. W. Surr. R., S.R., and to be sec'd.; 2nd Lieut. W. W. Glenn, R.A., and to be sec'd. Mar. 27th: Temp. 2nd Lieut. H. M. Jackson, R. Ir. Rif., seniority Jan. 1st, and to be transf. to Gen. List; Temp. 2nd Lieut. M. Lewis, Gen. List, seniority Jan. 10th. Mar. 28th, seniority Feb. 3rd: Lieut. C. G. Royston, Ind. Army; Temp. 2nd Lieut. C. M. Benjamin, Yorks. L.I., and to be transf. to Gen. List; 2nd Lieut. (on prob.) H. L. Storrs, S.R.; Temp. 2nd Lieut. H. G. Tucker, Gen. List. 2nd Lieut. R. I. Dines, Lond. R. (T.F.), and to be sec'd.; Mar. 27th, seniority Feb. 24th.

Equipment Officers, 2nd Class.—Lieut. A. N. Buchanan, S.R., from the 3rd Cl.; Mar. 1st.

3rd Class.—Temp. 2nd Lieut. R. C. Boddie, attd. Lan. Fus., and to be transf. to Gen. List; Dec. 10th. 2nd Lieut. J. R. Nicholls, Gen. List; Mar. 18th. April 1st: Temp. 2nd Lieut. (on prob.) E. W. Dexter, Gen. List; Temp. 2nd Lieut. R. S. Eachus, Gen. List.

Memoranda.—The under-mentioned, from R.F.C. to be Temp. 2nd Lieuts. (on prob.) for duty with the Mil. Wing of that Corps: 2nd Cl. Air-Mech. P. G. Pickwell; Feb. 19th. Flight-Sergt. C. H. Clifford; Feb. 28th. Flight-Sergt. E. T. L. Jones; April 4th. Flight-Sergt. A. E. Williams; April 6th.

London Gazette Supplement, April 26th.
Squadron Commander.—Capt. P. R. Grace, S.R., from a Flight-Comdr., and to be Temp. Major whilst so employed; April 8th.

Flight-Commanders, from Flying Officers, and to be Temporary Captains whilst so employed.—April 8th: Lieut. W. A. Bishop, Can. Gen. List; Lieut. P. E. M. Le Gallais, R. Suss. R. April 12th: Temp. 2nd Lieut. (Temp. Lieut.) H. G. Bowen, Gen. List; Lieut. S. H. Pratt, R. Fus., S.R.; 2nd Lieut. H. J. N. Drope, S.R.

Flying Officers.—April 2nd: Lieut. V. E. Schweitzer, Can. Gen. List; 2nd Lieut. (Temp. Lieut.) E. L. Roberts, Gen. List, from a Flying Officer (Ob.), seniority July 1st. Lieut. L. Drummond, Can. Engrs., from a Flying Officer (Ob.); April 3rd, seniority April 27th, 1916. Temp. 2nd Lieut. (on prob.) S. S. Turnbull, Gen. List; April 5th.

Flying Officers (Observers).—Feb. 21st: 2nd Lieut. L. H. Pakenham-Walsh, Ches. R. (T.F.), seniority Feb. 3rd, and to be sec'd.; 2nd Lieut. A. D. Ferguson, High. L.I., S.R., seniority Feb. 13th, and to be sec'd. Lieut. W. R. Kempson, R.F.A. (T.F.), and to be sec'd.; Feb. 23rd, seniority Feb. 14th. Capt. R. E. C. Knight-Bruce, Yeo. (T.F.), and to be sec'd.; Feb. 22nd, seniority Feb. 18th. April 3rd: Temp. 2nd Lieut. (on prob.) J. H. Q. Campbell, Gen. List, seniority Nov. 22nd; Lieut. H. H. Evans, Can. Mtd. Rif., with seniority from Nov. 29th; Temp. Lieut. J. F. Downing, S. Staff. R., seniority Dec. 8th, and to be transf. to Gen. List; Temp. 2nd Lieut. E. M. Harwood, M.C. R.A., seniority Jan. 20th, and to be transf. to Gen. List; Temp. Lieut. G. C. Cuthbertson, York. R., seniority Jan. 25th, and to be transf. to Gen. List April 3rd, seniority Feb. 24th; 2nd Lieut. B. H. Street, Welsh R. (T.F.), and to be sec'd.; 2nd Lieut. L. J. S. Dowland, Yeo. (T.F.), and to be sec'd.; 2nd Lieut. H. C. Beeston, Essex R. (T.F.), and to be sec'd.

Adjutant.—Lieut. (Temp. Capt.) W. A. A. Chauncey, York R., vice Major M. Freeman, Worc. R., S.R.; Feb. 28th.

Park Commander.—Temp. Capt. A. S. Morris, Gen. List, from an Equipment Officer, 1st Cl., and to be Temp. Major whilst so employed; April 1st.

Equipment Officers, 1st Class.—2nd Lieut. (Temp. Lieut.) E. W. Havers, S.R., from the 2nd Cl., and to be Temp. Capt. whilst so employed; April 1st.

2nd Class.—April 1st: Qr.-Mr. and Hon. Lieut. W. E. Aylwin, R.F.C., and to be Temp. Lieut. whilst so employed. From the 3rd Cl., and to be Temp. Lieuts. whilst so employed: 2nd Lieut. A. C. Smith, S.R.; 2nd Lieut. R. Donald, S.R. Capt. A. D. S. Barr, R.E. (T.F.), from the 3rd Cl. From the 3rd Cl., and to be Temp. Lieuts. whilst so employed: Temp. 2nd Lieut. W. B. Evertson, Gen. List; 2nd Lieut. S. A. Harding, S.R.; 2nd Lieut. R. T. Vernon, S.R.; 2nd Lieut. T. G. MacKenzie, S.R.; 2nd Lieut. W. W. Hall, S.R.; 2nd Lieut. J. D. Campion, S.R.

Memoranda.—W. C. Clark to be Temp. 2nd Lieut. for duty with R.F.C., Oct. 23rd. 3rd Cl. Air-Mech. Hardit Singh Malik, from R.F.C., to be Temp. Hon. 2nd Lieut. for duty with R.F.C.; April 6th.

Supplementary to Regular Corps.—The under-mentioned 2nd Lieuts. (on prob.) are confirmed in their rank: J. A. W. Armstrong, H. L. Storrs, C. G. Wood, A. S. Turner, H. Fuller-Clark, J. W. Boulter, C. W. McKissock, N. H. Mackrow. The under-mentioned to be 2nd Lieuts. (on prob.): D. Gow; Mar. 29th. G. F. Allison; Mar. 31st. J. H. Valentine; April 2nd. A. Wyatt; April 4th.

General List, R.F.C.—The under-mentioned Cadets to be Temp. 2nd Lieuts. (on prob.): April 4th: P. G. Bankart, C. H. Barton, T. Carson, A. E. Cambridge, P. J. Casey, E. B. Cogswell, F. Cornish, N. J. Dakers, H. S. Diment, M. Duddridge, F. H. Foster, S. T. Grant, A. R. Gibson, W. Hefferman, S. H. Inglis, R. N. W. Jeff, J. T. Johnson, K. S. Kirkaldy, C. Lillierap, F. M. Magennis, L. H. McRobert, J. W. Mullen, A. R. H. Noss, J. O'Rourke, G. E. Randall, G. B. Bobeson, H. Rowbotham, G. F. Webb, P. F. H. Webb, L. F. Williams; Mar. 17th: E. J. A. Burke and L. Brokenshire.

London Gazette, April 27th.
Temporary Appointments at War Office.
Staff Captain.—2nd Lieut. E. S. Halford, R.F.C., S.R., from an Equipment Officer, 3rd Cl., and to be Temp. Capt. whilst so employed; April 11th.

Squadron Commanders.—Temp. Capt. K. R. van der Spuy, M.C., Gen. List, from a Flight-Comdr., and to be Temp. Major whilst so employed; April 13th. The appointment of Temp. Major P. G. Ross-Hume, Gen. List, notified in the *Gazette* of Feb. 24th, is ante-dated to Sept. 25th, but not to carry pay or allowances prior to Feb. 9th.

Flight-Commanders, from Flying Officers, and to be Temporary Captains whilst so employed.—2nd Lieut. G. Mackrell, S.R.; April 2nd. 2nd Lieut. J. H. T. Letts, Linc. R.; April 5th. Temp. 2nd Lieut. E. J. Garland, Gen. List; April 7th. Lieut. R. A. Logan, S.R.; April 8th. 2nd Lieut. C. Sutton, S.R.; April 10th. From Flying Officers:—April 11th: Capt. E. B. Grenfell, D. of Corn. L.I. (T.F.); 2nd Lieut. (Temp. Lieut.) H. M. Probyn, R. War. R. (T.F.), and to be Temp. Capt. whilst so employed.

Flying Officers.—Temp. 2nd Lieut. M. A. Hancock, Gen. List; Feb. 10th. April 3rd: Lieut. D. Carruthers, Can. A.S.C., from a Flying Officer (Ob.), seniority Feb. 20th, 1916; Lieut. S. B. Horn, D. Gds., from Mach. Gun Corps; Temp. 2nd Lieut. G. B. Davies, attd. K. R. Rif. C., and to be transf'd. to Gen. List; 2nd Lieut. (on prob.) R. H. New, S.R.; Temp. 2nd Lieut. (on prob.) H. P. Lale, Gen. List; April 5th: 2nd Lieut. C. E. Barrington, R.A., from a Flying Officer (Ob.), seniority July 11th; 2nd Lieut. J. A. W. Armstrong, S.R.; 2nd Lieut. D. F. Lawson, Dorset R., and to be sec'd.; Temp. 2nd Lieut. (on prob.) J. H. Wallace, Gen. List; Temp. 2nd Lieut. (on prob.) A. E. J. Dobson, Gen. List; April 6th: Temp. 2nd Lieut. M. A. White, Gen. List; Temp. 2nd Lieut. (on prob.) A. G. Harrison, Gen. List; Temp. 2nd Lieut. (on prob.) M. B. Frew, Gen. List; April 7th: Major E. O. McMurtry, Can. Gen. List; Lieut. T. S. Malcomson, R.F.A. (T.F.), and to be sec'd.; Temp. 2nd Lieut. E. V. D. Mathews, Gen. List, from a Flying Officer (Ob.), seniority May 2nd; Temp. 2nd Lieut. H. A. Francis, Gen. List; 2nd Lieut. W. V. T. Rooper, Yeo. (T.F.), and to be sec'd.; 2nd Lieut. (on prob.) R. E. Taylor, S.R.; Temp. Lieut. T. R. Hepple, R. Ir. Rif., and to be transf'd. to Gen. List; Temp. Lieut. R. J. B. Benson, attd. Welsh R., and to be transf'd. to Gen. List; Lieut. R. M. Roberts, Yorks. L.I., and to be sec'd.; 2nd Lieut. (on prob.) D. Mactavish, Cam'n. Highrs. (T.F.), and to be sec'd.; Temp. 2nd Lieut. (on prob.) A. Hepburn, Gen. List; Temp. 2nd Lieut. (on prob.) G. A. Rose, Gen. List; Capt. R. B. Bourdillon, S.R., from an Experimental Officer, 1st Cl. (graded as an Equipment Officer, 1st Cl.); April 11th, seniority May 15th, 1916.

Flying Officers (Observers).—2nd Lieut. R. V. Hamilton, R. War. R. (T.F.), and to be sec'd.; Jan. 30th, seniority Sept. 25th. Temp. 2nd Lieut. A. Bonner, W. Rid. R., and to be transf'd. to Gen. List; April 3rd, seniority Dec. 8th. Temp. Lieut. A. C. C. Rawlins, A.S.C., and to be transf'd. to Gen. List; April 6th, seniority Dec. 26th. 2nd Lieut. H. S. Evamy, Lond. R. (T.F.), and to be sec'd.; April 5th, seniority Dec. 27th. April 6th: Temp. 2nd Lieut. J. E. A. R. Daly, British W. Indies Regt., seniority Dec. 27th; 2nd Lieut. G. Hall, Lond. R. (T.F.), seniority Dec. 31st, and to be sec'd.; 2nd Lieut. A. J. Allen, Lpool. R. (T.F.), seniority Jan. 1st, and to be sec'd.; Lieut. J. A. Clarke, R.A., seniority Jan. 7th, and to be sec'd.; Capt. W. S. Brayshaw, A.S.C. (T.F.); April 5th, seniority Jan. 10th. 2nd Lieut. (on prob.) T. G. Jefferies, R.F.A., S.R.; April 6th, seniority Jan. 24th. 2nd Lieut. (Temp. Lieut.) R. L. Briscoe, S. Lan. R. (T.F.), and to be sec'd.; April 4th, seniority Jan. 25th. Lieut. J. W. G. Clark, Can. Inf. Bn.; April 6th, seniority Jan. 28th. Temp. 2nd Lieut. L. Clarke, attd. Manch. R., and to be transf'd. to Gen. List; April 6th, 1916. Temp. 2nd Lieut. (on prob.) C. W. Leggatt, E. Surr. R., and to be transf'd. to Gen. List; April 7th, seniority Oct. 29th. April 8th: 2nd Lieut. (Temp. Lieut.) A. F. Tabraham, R.E. (T.F.), seniority Nov. 26th, and to be sec'd.; 2nd Lieut. N. Mellor, W. Rid. R. (T.F.), seniority Dec. 9th, and to be sec'd. Temp. 2nd Lieut. E. B. Hamel, attd. S. Staff. R., and to be transf'd. to Gen. List; April 9th, seniority Dec. 29th. Temp. 2nd Lieut. H. C. W. Strickland, attd. E. Surr. R., and to be transf'd. to Gen. List; April 7th, seniority Feb. 23rd. The appointment of 2nd Lieut. (Temp. Capt.) T. Capel, A.S.C., notified in the *Gazette* of Mar. 9th, is cancelled.

Balloon Company Commander (graded as a Flight-Commander).—2nd Lieut. (Temp. Lieut.) H. P. L. Higman, R.E. (T.F.), from a Balloon Comdr. (graded as a Balloon Officer), and to be Temp. Capt. whilst so employed; April 4th.

Balloon Commander (graded as a Balloon Officer).—From Balloon Officer:—April 7th: 2nd Lieut. (Temp. Lieut.) A. G. Church, R.G.A., S.R.

Balloon Officers.—Temp. 2nd Lieut. K. I. Goodman, Gen. List; Jan. 31st. April 7th: 2nd Lieut. (on prob.) H. F. Barnes, M.C., R.G.A., S.R.; 2nd Lieut. M. E. Stuchfield, R.F.A., S.R.; Temp. Lieut. W. T. Taylor, attd. R. Ir. Fus., and to be transf'd. to Gen. List; April 8th.

Equipment Officers, 1st Class.—2nd Lieut. (on prob.) H. V. W. Stagg, S.R. and to be Temp. Capt. whilst so employed; April 1st.

2nd Class.—And to be Temp. Lieuts. whilst so employed:—Mar. 20th: 2nd Lieut. (on prob.) F. D. Brooker, S.R.; 2nd Lieut. (on prob.) A. P. Sargeant, S.R. Mar. 30th: 2nd Lieut. (on prob.) A. H. Barnard, S.R.; 2nd Lieut. (on prob.) G. M. Erroll, S.R.; 2nd Lieut. (on prob.) A. F. Warner, S.R. 2nd Lieut. (on prob.) A. Wyatt, S.R.; April 5th. Temp. Lieut. R. H. Sievwright, Gen. List, from a Flying Officer; April 12th.

3rd Class.—2nd Lieut. (on prob.) R. A. Watson, S.R.; Feb. 14th. Temp. 2nd Lieut. A. Christian, Gen. List; Mar. 6th. Lieut. W. A. Berry, D. Gds., and to be sec'd.; Mar. 14th. April 1st: Temp. 2nd Lieut. (on prob.) W. D. Miller, Gen. List; 2nd Lieut. A. Wombwell, Linc. R., and to be sec'd. Temp. 2nd Lieut. F. A. Fyfe, M.C., Gen. List, from a Flying Officer (Ob.); April 6th.

Experimental Officer, 3rd Class (graded as an Equipment Officer, 3rd Class).—2nd Lieut. G. McKerron, S.R., from an Equipment Officer, 3rd Cl.; April 10th.

Supplementary to Regular Corps.—The under-mentioned Lieuts. to be Capt.: Mar. 31st: (Temp. Major) H. S. Ebben and L. M. Wells Bladen.

London Gazette Supplement, April 28th.

Staff Officers, 2nd Class (graded for Pay as Brigade Majors).—From Staff Officers, 3rd Cl. (graded as Staff Capt.): Lieut. (Temp. Capt.) T. M. Eggar, Lond. R. (T.F.), vice Temp. Lieut. (Temp. Capt.) J. B. Solomon, Oxf. and Bucks L.I.; Mar. 26th. Lieut. (Temp. Capt.) G. D. Pidgeon, S.R.; April 4th.

3rd Class (graded for Pay as Staff Captains).—Feb. 22nd: Capt. H. Elwell, R. Suss. R. (T.F.), and to be sec'd.; Temp. Capt. W. B. Adams, attd. S. Staff. R., and to be transf'd. to Gen. List; Temp. Lieut. E. P. Stapleton, R. Fus., and to be transf'd. to Gen. List, and to be Temp. Capt. whilst so employed. Temp. Capt. F. W. Trott, M.C., attd. Devon. R., and to be transf'd. to Gen. List, vice Lieut. (Temp. Capt.) T. M. Eggar, Lond. R. (T.F.); Mar. 26th. Temp. Lieut. G. R. Moser, Arg. and Suthd. Highrs., from an Adj't., R.F.C., and to be Temp.

Capt. whilst so employed, vice Lieut. (Temp. Capt.) G. D. Pidgeon, S.R.; April 4th.

Flight-Commanders.—Capt. G. C. Pirie, Sco. Rif., S.R., from a Flying Officer; April 12th. From Flying Officers, and to be Temp. Capt. whilst so employed: 2nd Lieut. E. E. E. Pope, S.R.; April 13th. 2nd Lieut. W. T. Hall, S.R.; April 14th.

Flying Officers.—Temp. 2nd Lieut. C. W. Beatty, Gen. List; April 5th. Lieut. W. J. Rutherford, Can. Gen. List; April 6th. Temp. 2nd Lieut. (on prob.) H. Howells, Gen. List; April 7th. 2nd Lieut. W. E. Jenkins, E. Surr. R., and to be sec'd.; April 8th.

Flying Officer (Observer).—The initials of Temp. 2nd Lieut. (on prob.) E. C. Davies, Gen. List, are as now described, and not as in the *Gazette* of Mar. 27th.

Equipment Officers, 3rd Class.—Temp. 2nd Lieut. W. C. Clark, Gen. List; Nov. 23rd. April 1st: Temp. 2nd Lieut. E. H. Trump, Gen. List; Temp. 2nd Lieut. (on prob.) C. L. Mitchell, Gen. List; Temp. 2nd Lieut. P. M. Brambleby, Gen. List. Temp. 2nd Lieut. E. J. Briscoe, Gen. List. 2nd Lieut. R. J. Sladden, Gen. List; April 6th.

Schools of Instruction: Schools of Military Aeronautics

Examining Officer (graded as an Equipment Officer, 1st Class).—Temp. Capt. T. E. Gilmore, Gen. List, from graded as an Equipment Officer, 2nd Cl.; Mar. 29th.

Memoranda.—Temp. Lieut. D. B. Woolley, from R. Mar., to be Temp. Lieut. for duty with R.F.C.; Mar. 11th, seniority Oct. 30th. The under-mentioned, from R.F.C., to be Temp. 2nd Lieuts. (on prob.) for duty with the Mil. Wing of that Corps: 1st Cl. Air-Mech. C. C. Cox; April 1st. Sergt. H. M. Franklin; April 7th. The under-mentioned to be Temp. 2nd Lieuts. (on prob.) for duty with R.F.C.: G. A. Maclean; Feb. 27th. A. L. Simms; April 7th. Actg. Staff-Sergt. R. C. Ryan, from R.A.M.C. (T.F.); April 14th.

Supplementary to Regular Corps.—The under-mentioned 2nd Lieuts. (on prob.) are confirmed in their rank: W. G. Cullen, S. L. Collins, W. P. Farlow, B. S. Higgs, B. A. Hill, R. Hely, B. B. Johnson, H. Kirby, W. E. Lowe, H. J. Lewis, A. C. F. Lewns, H. S. Lewin, M. C. McGregor, A. McCulloch, D. H. Moore, P. H. Paul, F. J. R. Perfit, A. H. Prior, W. Gardner, C. Guthrie, J. F. Bargman, H. J. Ashwell, H. J. Skingle, W. E. Dewbery, R. J. Saunders, J. I. Thompson, W. Towell, G. Ashworth, G. G. Wood, W. F. Thrutchley, S. Eckby, R. Stanley-Smith, H. J. Clark, A. H. Page, S. W. Graham, G. H. S. Dinsmore, M. A. Benjamin, R. A. Watson, M. G. Gunn. The under-mentioned to be 2nd Lieuts. (on prob.): W. W. Hammond; Sept. 24th. Jan. 19th: W. W. Cook, H. W. Collier, H. F. S. Drewitt, A. W. Gordon and F. J. Sharland.

Special Reserve of Officers (R.F.C.).—The surname of 2nd Lieut. L. Read is as now described, and not as in the *Gazette* of April 11th.

London Gazette Supplement, April 30th.

The under-mentioned to be Temp. 2nd Lieuts., for duty with R.F.C.: Staff-Sergt. V. F. Toulmin, from A. and N.Z. Mtd. Div.; Feb. 28th. Sergt. A. J. S. Winton, from N.Z.E.F.; Feb. 28th. Staff-Sergt. F. E. Neily, from Can. A.M.C.; Mar. 1st. Sergt. E. Jones, from R.F.C.; April 2nd.

Flying Officers.—Mar. 30th: Capt. R. B. Lockhart, Cyclist En. (T.F.), and to be sec'd.; 2nd Lieut. A. R. Adam, Sea. Highrs. (T.F.), and to be sec'd. April 7th: Lieut. B. C. O'D. Douglas, Conn. Rang., and to be sec'd.; Temp. 2nd Lieut. G. G. Jackson, attd. Essex R., and to be transf'd. to Gen. List; Temp. 2nd Lieut. (on prob.) E. J. Stockman, attd. Berd. R., and to be transf'd. to Gen. List; Temp. 2nd Lieut. C. F. K. Pierson, Gen. List. April 8th: Temp. 2nd Lieut. G. H. Munro, R. Fus., and to be transf'd. to Gen. List; 2nd Lieut. G. H. S. Dinsmore, S.R.

Flying Officers (Observers).—Mar. 29th: Temp. 2nd Lieut. (on prob.) C. E. Wilson, Gen. List, seniority Sept. 30th; Temp. 2nd Lieut. (on prob.) W. G. Ivamy, Gen. List, seniority Dec. 22nd; Temp. 2nd Lieut. W. B. Protheroe, Welsh R., and to be transf'd. to Gen. List; Mar. 28th, seniority Jan. 1st. Mar. 29th, seniority Jan. 4th: Lieut. G. E. G. Craig, Can. Pioneer En.; Temp. Lieut. H. C. Stephens, R.E. Mar. 29th: Temp. 2nd Lieut. F. C. C. Manley, R.A., seniority Jan. 11th, and to be transf'd. to Gen. List; Temp. 2nd Lieut. W. R. Tate, Northn. R., seniority Jan. 14th, and to be transf'd. to Gen. List; Temp. 2nd Lieut. B. Farmer, E. Kent R., seniority Jan. 16th, and to be transf'd. to Gen. List; 2nd Lieut. F. P. Allbutt, R. W. Fus. (T.F.), from attd. Linc. R. (T.F.), seniority Jan. 23rd, and to be sec'd.; Temp. 2nd Lieut. (on prob.) L. C. Tyson, W. Rid. R., seniority Jan. 28th, and to be transf'd. to Gen. List; Mar. 28th, seniority Feb. 3rd: Capt. S. Barne, M.C., Hrs., and to remain sec'd.; 2nd Lieut. (on prob.) G. A. Cranswick, York and Lanc. R., S.R., and to be sec'd. Temp. 2nd Lieut. L. G. Fauvel, Gen. List; April 10th, seniority Oct. 23rd. Temp. Lieut. D. B. Woolley, Gen. List; Mar. 11th, seniority Oct. 30th. April 10th: Temp. 2nd Lieut. J. D. M. Stewart, Gen. List, seniority Nov. 7th; Temp. 2nd Lieut. (on prob.) N. Rycroft, Gen. List, seniority Nov. 21st; Temp. 2nd Lieut. E. H. Baker, Gen. List, seniority Dec. 26th; Temp. 2nd Lieut. C. B. Holland, Gen. List, seniority Mar. 9th. April 11th, seniority Mar. 9th: Temp. Capt. H. W. Wall, Middx. R., and to be transf'd. to Gen. List; 2nd Lieut. (Temp. Lieut.) L. W. Allen, R. War. R. (T.F.), and to be sec'd.; 2nd Lieut. H. Davis, E. York. R., S.R., and to be sec'd.; 2nd Lieut. M. A. Benjamin, S.R. April 10th: Temp. 2nd Lieut. C. B. Boughton, attd. Welsh R., seniority Mar. 10th, and to be transf'd. to Gen. List; Capt. K. G. Macdonald, Can. Field Art., seniority Mar. 20th.

Balloon Commander (graded as a Balloon Officer).—Capt. F. J. F. Lee, R. Muns. F., from a Balloon Officer; April 7th.

Equipment Officers, 3rd Class.—2nd Lieut. (Temp. Lieut.) A. H. C. Bruce, R.A., from a Flying Officer; Feb. 22nd. April 11th: 2nd Lieut. R. Stanley-Smith, S.R.; 2nd Lieut. J. I. Thompson, S.R.; 2nd Lieut. W. F. Thrutchley, S.R.; 2nd Lieut. (on prob.) D. Warnford-Davis, S.R.; 2nd Lieut. H. J. Clark, S.R.; 2nd Lieut. (on prob.) J. O. Clover, S.R.; 2nd Lieut. W. Gardner, S.R.; 2nd Lieut. H. S. Lewin, S.R.; 2nd Lieut. A. C. F. Lewns, S.R.; 2nd Lieut. A. H. Page, S.R.; 2nd Lieut. R. J. Saunders, S.R.

Memoranda.—Flight-Sergt. D. F. Upjohn, from R.F.C., to be Temp. 2nd Lieut. (on prob.) for duty with R.F.C.; April 5th. 2nd Lieut. E. H. Peverell, from Indian Army, to be Temp. 2nd Lieut. (on prob.) for duty with R.F.C.; April 25th.

Royal Flying Corps (Territorial Force).

Major H. Fowler, R.E. (T.F.), to be Lieut.-Col. (Temp.); April 7th.

London Gazette Supplement, April 25th.

Major H. Fowler, R.E. (T.F.), to be Lieut.-Col. (Temp.); April 7th.

Another Destroyed Zeppelin Story.

ACCORDING to frontier correspondents, German deserters arriving at Maastricht state that on April 23rd one of the newest Zeppelins was destroyed in a storm on a trial trip between Friedrichshafen and Wilhelmshafen. The gale overturned the airship east of Duisbourg. An explosion ensued, and the wreckage fell in a wood. The crew, including two under-managers of the Zeppelin works, were killed.

The Lost British Airship.

MESSAGES from Berlin state that the lost British airship

was brought down by two German aeroplanes 20 miles off Zeebrugge on April 21st. The Berlin message states that there were three men in the car, but the *Kölnische Zeitung* gives the crew as eight.

A Derelict Austrian Seaplane.

A SEMI-OFFICIAL statement published in Rome on Monday says that "an Austro-Hungarian seaplane, the K 188, has been recovered derelict, the airman having probably perished in the sea."

AIRCRAFT WORK AT THE FRONT.

OFFICIAL INFORMATION.

British.

War Office, April 24th.

"Egypt.—Our artillery, assisted by aircraft co-operation, have blown up an ammunition dump in Gaza."

General Headquarters, April 24th.

"Yesterday there was a greater amount of fighting in the air than has before taken place in a single day. Our aeroplanes attacked the enemy's machines wherever they could be found with striking success, going far behind the German lines and bombing his railways, dumps, and aerodromes, and have compelled him to give battle. In the course of the fighting 15 German machines were brought down and destroyed and 24 others were driven down out of control, the majority of which probably crashed. A large twin engine three-seater German machine was brought down in our lines, and its occupants made prisoners. Only two of our machines are missing."

General Headquarters, April 25th.

"Fine weather enabled our aeroplanes to carry out many raids again yesterday, and bombs were dropped with good effect upon the enemy's railway junctions, aerodromes, billets, and ammunition dumps. In one raid a large bomb struck the engine of a moving train, blowing the engine off the line and wrecking the train. Hostile troops and transport were also successfully engaged with machine-gun fire. There was again a great amount of air fighting, in the course of which seven German machines were brought down, and eight others were driven down out of control. Two German observation balloons were also destroyed. Six of our machines are missing."

General Headquarters, April 26th.

"Successful work was carried out by our aeroplanes yesterday, in spite of less favourable weather. In air-fighting two German machines were brought down, one of them falling in our lines, and a third was driven down out of control. Three of our machines are missing."

War Office, April 26th.

"Salonica.—Our aircraft carried out a raid on an enemy depôt at Cernista, causing considerable damage, and subsequently dispersed an enemy squadron which was attempting to cross our lines. One of our machines was destroyed."

War Office, April 27th.

"Salonica.—Heavy rain has interfered with aerial activity, but a steady bombardment of the enemy positions has been maintained by our artillery."

General Headquarters, April 27th.

"Yesterday activity in the air was again marked. In air fighting seven German aeroplanes were brought down and six others were driven out of control. One hostile balloon was also destroyed. Six of our aeroplanes are missing."

General Headquarters, April 28th.

"Three German aeroplanes were brought down yesterday in air fighting, and a fourth was shot down by our anti-aircraft guns. One hostile observation balloon was also destroyed. Three of our aeroplanes are missing."

General Headquarters, April 29th.

"In air fighting yesterday two German aeroplanes were brought down and one other was driven out of control. Three of our machines are missing."

General Headquarters, April 30th.

"There was great activity in the air yesterday and during the night. Bombs were dropped with effect at a number of points behind the enemy's lines, causing several fires, and in one case a large explosion. Three enemy trains were also hit by our bombs."

"The enemy fought hard to protect the points attacked, and in the course of the fighting 10 German aeroplanes were brought down, and 10 others were driven down out of control. 15 of our machines are missing."



New German Machine Smashed.

A REPORT from Zurich states that during a trial trip of a new model German aeroplane at Friedrichshafen, on April 26th, the machine fell, and its three occupants were killed.

Holland's Anti-Aircraft Guns.

In a written reply to questions in the First Chamber, Col. Bosboom, the Dutch Minister of War, stated that Dutch anti-aircraft guns designed as a protection against Zeppelins are efficient.

French.

Paris, April 22nd.

"Salonica.—An enemy aeroplane was forced to land in the Koritza region. The two officers on board were taken prisoners."

Paris, April 24th.

"Salonica.—English airmen repulsed enemy aeroplanes and bombed enemy depôts at Sistovo."

Paris, April 26th.

"During April 23rd and 24th six German aeroplanes were felled in aerial fights by our pilots. In addition, 16 other enemy machines were seen to fall in their lines seriously damaged. Between April 16th and 22nd our pilots appreciably increased the number of their exploits. Sub-Lieutenant Dorme brought down his nineteenth and his twentieth enemy machine, Sub-Lieutenant Deulin his fourteenth, Lieutenant Pinsart his ninth and tenth, Sub-Lieutenant Tarascon his tenth, Sub-Lieutenant Languedoc his sixth and seventh, and finally Adjutant Lufbery has brought down eight machines up to date."

"Salonica.—An enemy aeroplane fell in flames in the region of Doiran."

Paris, April 27th.

"During April 26th, three German aeroplanes were brought down by our pilots and six others were seriously damaged and were either obliged to land or fell in their own lines. During the night of the 26th one of our bombarding squadrons dropped numerous bombs on the railway stations and bivouacs in the region of Ribemont and Crécy-sur-Serre."

Paris, April 28th.

"During April 27th two German aeroplanes were brought down in an aerial fight, and six others were forced to land, damaged. It is confirmed that four German machines, which were reported as disabled were really felled by our pilots, one of them on the 24th, and the three others on April 26th."

Russian.

Petrograd, April 27th.

"In the region of Stanislaw the enemy artillery brought down one of our airships, which fell in our lines. The machine was wrecked, but the crew were saved."

Italian.

Rome, April 25th.

"An enemy aeroplane was brought down within our lines, and the wounded aviators were taken prisoners."

German.

Berlin, April 25th.

"On the 23rd the British and French in aerial fighting lost 20 aeroplanes and one captive balloon; on the 24th 19 of their aeroplanes were accounted for, 16 of which were brought down in aerial combats, and three by the fire of our anti-aircraft guns. Lieutenant Bernert brought down his twentieth, twenty-first, and twenty-second adversary. During one of our counter thrusts near Gavrelle, Captain Zorer, the leader of a reserve-echelon, flew in front of the storming infantry at a height of 150 yards, and from his aeroplane bombarded the English lines with his machine-gun."

Berlin, April 26th.

"Yesterday the enemy lost six aeroplanes, of which Lieutenant Schaefer brought down two, his twenty-second and twenty-third."

Berlin, April 27th.

"In the West the enemy lost 11 aeroplanes (nine of which fell in air combats) and two captive balloons. Lieutenant Wolf was victorious for the twenty-first time in an air battle."

"Balkans.—On April 25th, between the Vardar and Lake Doiran, two British aeroplanes were brought down by one of our squadrons."

Bulgarian.

Sofia, April 25th.

"Near Sejdeli an enemy aeroplane was brought down by artillery fire."



A Raid on Zeebrugge.

ALLIED aviators carried out another raid on Zeebrugge harbour on Sunday afternoon, according to reports received by Dutch papers. The anti-aircraft batteries put up a vigorous defence. A German communiqué states that 15 bombs fell into the water in proximity to naval vessels, but that none was hit; two sheds on the harbour wall were damaged by air pressure.

It is learned that in the previous attack on Zeebrugge two harbour walls were partially destroyed.

Compensation for Raid Damage.

REPRESENTATIVES of a large number of municipalities and other local bodies attended a meeting at the Mansion House, London, on April 25th, to support the Committee on War Damage in its appeal to the Prime Minister, on behalf of 718 municipalities with a population of 28,112,936, asking that the burden of damage inflicted by enemy aircraft and bombardment shall be made a charge on national funds.

The Lord Mayor, in opening the meeting, said the question was an important one, and he could not conceive why any man should oppose the idea that the State should pay for damage done by the enemy. Those who had suffered from the war he hoped would be compensated after the war for damage done to their property. The French State was paying for damage done in France, and he declared that was a just proceeding.

Lord Parmoor moved a resolution, stating that:—

"The Government Aircraft and Bombardment Insurance Scheme bore with peculiar severity on certain sections of the community, while other sections were entirely free from its incidence; that therefore the attention of the new Government should be called to the matter; and that the Prime Minister be asked to receive a deputation with a memorial urging the Government to abandon the insurance scheme and revert to the policy of compensation from national funds, as the only just and effective way of relieving individual sufferers from war burdens, which, in common fairness, should be borne by the whole community."

He said that, although the insurance rates had been reduced 50 per cent., they were still too high.

The Lord Mayor of York seconded the resolution.

Sir Hugh Bell said the whole of the urban population of the kingdom was in favour of the objects of the Committee, and the Mayor of Margate said that 75 per cent. of the premiums under the insurance scheme came from the East Coast.

Bombs in Switzerland.

DURING the evening of April 24th two bombs were dropped at Porrentruy. A house was very much damaged and several of the occupants were slightly injured. The pilot's nationality is not known, but the machine was fired at by the Swiss troops. The *Lausanne Gazette* reports that the aeroplane disappeared in the direction generally followed by German aviators returning from raids in France, and it is believed that it was a German machine.

Germany has expressed regret for a recent violation of Swiss territory, when a German aeroplane flew over the frontier and landed near Doettingen. It is explained that the machine was unarmed and that the airmen will be punished.



Blinding the Enemy.

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IMPORTS AND EXPORTS, 1916-1917.

AEROPLANES, airships, balloons, and parts thereof (not shown separately before 1910). For 1910 and 1911 figures, see "FLIGHT" for January 25th, 1912; for 1912 and 1913, see "FLIGHT" for January 17th, 1914; for 1914, see "FLIGHT" for January 15th, 1915; for 1915, see "FLIGHT" for January 13th, 1916; and for 1916, see "FLIGHT" for January 11th, 1917.

	Imports.		Exports.		Re-Exportation.	
	1916.	1917.	1916.	1917.	1916.	1917.
January ...	£ 1,509*	£ 10,842	£ 6,399	£ 67,033	Nil.	Nil.
February ...	6,444	9,479	30,693	26,512	—	6
March ...	3,388	11,158	17,872	58,517	7	—
	11,341	31,479	54,964	152,062	7	6

* January, 1916, correct amount £1,509, not £1,009 as printed in our February issue.

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